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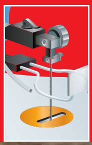

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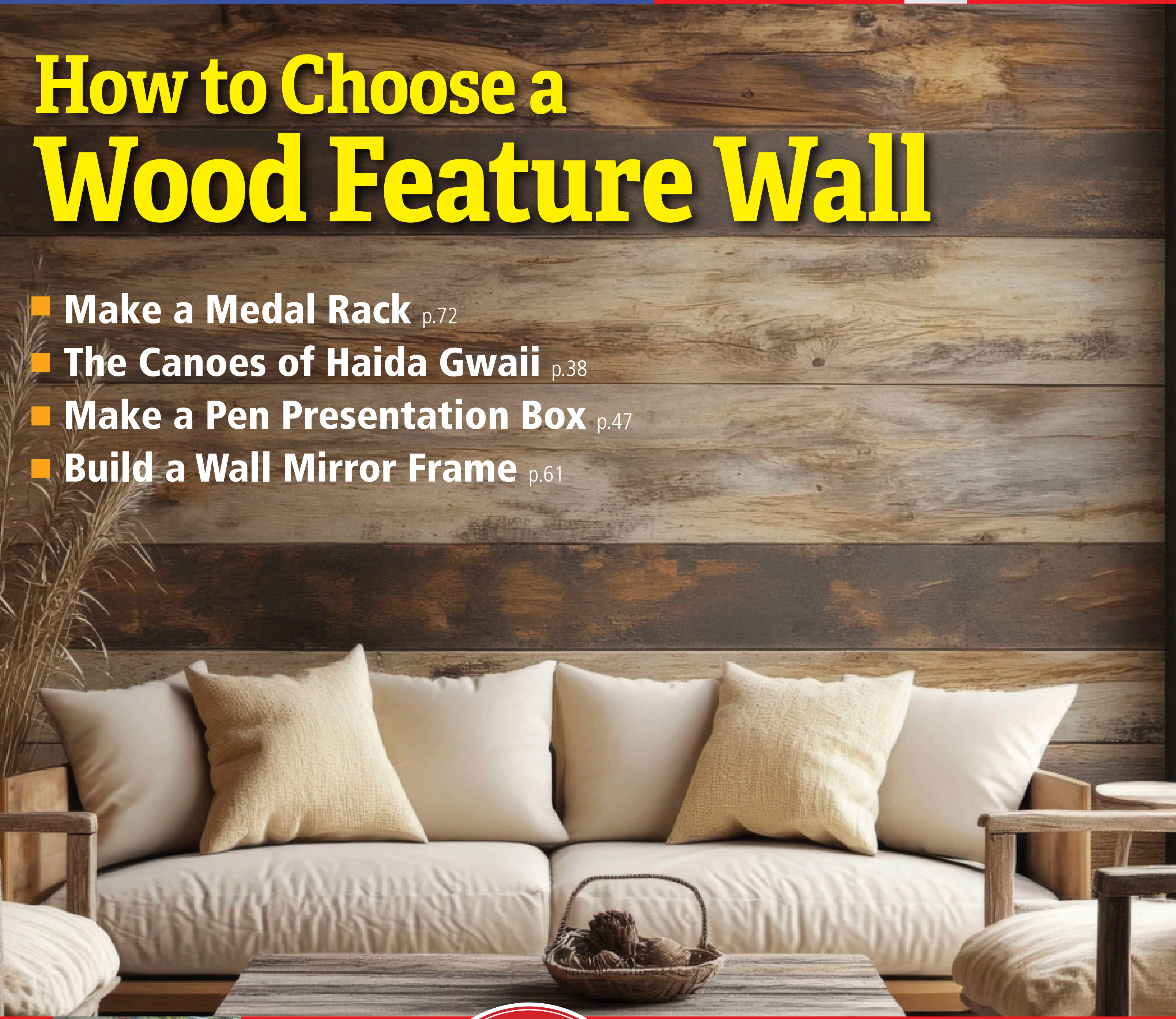

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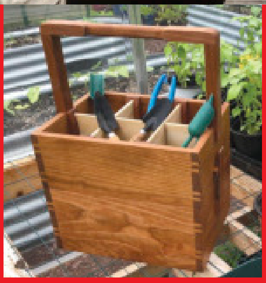

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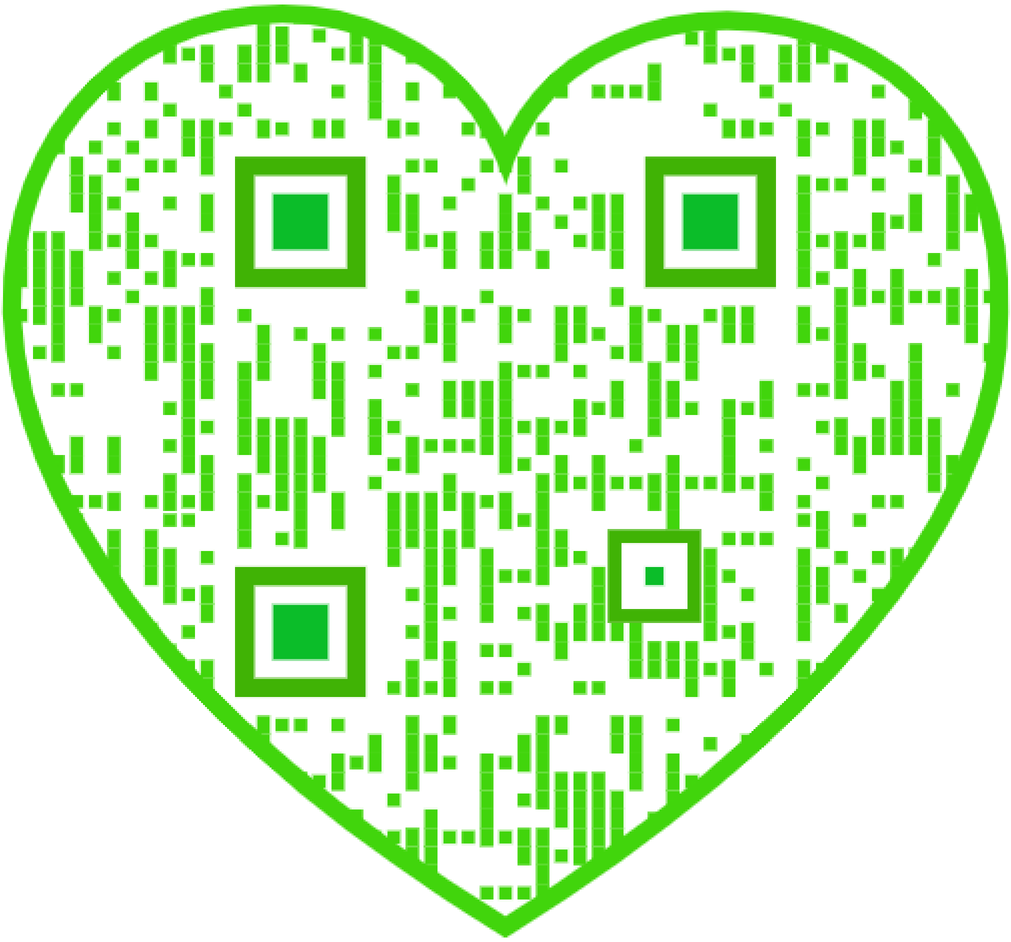

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editor's letter

rbrown@canadianwoodworking.com

Projects make the woodworking world go 'round, and that's what we're featuring heavily in this issue. Even if you prefer technique-based articles that will further hone your skills and push your boundaries, it's very likely you enjoy them in order to put those new skills to work when crafting your next project.

We have a total of five projects in this issue, all of which are quite beginner-friendly. A toy box made from 2×6s, which new contributer David Takeda describes, would make a great weekend project for many, while a medal rack and mirror frame I write about also fall into this category. Long-time contributor James Dobson shows how he makes beautiful little presentation boxes for the pens he turns and gives away. This project revolves around hand tools, but there's nothing wrong with plugging in a tool or machine to make these little gems. And Rick Campbell, who's written many articles for a variety of woodworking publications, shares how he made a garden tote for the upcoming planting season. This project is likely the most complex of the bunch, but Rick does a great job of simplifying the process so you'll be organized and ready to start seeding your vegetables in no time.

If it's an indoor project you're after, check out Carl Duguay's column on wood feature walls. Carl covers the different approaches to using wood and sheet goods to create a beautiful, functional focal point in any area of your home or condo. There are options for every skill level here.

Projects are great, but my favourite article in this issue is by Bruce Kemp. Bruce wrote a piece about rebuilding the gates in the Rideau Canal lock system in Ontario a couple of years ago, which I received more letters about (almost all positive, too!) than for any other article in recent memory. He's hit another home run here. The "Canoes of Haida Gwaii" take you deep into British Columbia's Queen Charlotte Islands, where the Haida people have been building and using canoes for centuries. It's an area of our great country I've never visited, but after reading his story I feel like I've explored those impressive forests and have met incredible craftspeople from the distant past.

All this, in addition to our regular columns, will surely keep you inspired and busy for the coming months. As always, I'd love to hear from you about anything related to woodworking.

— Rob Brown, Editor

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25 years as Canada's most trusted woodworker resource

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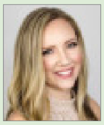

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CANADIAN Woodworking & HOME IMPROVEMENT

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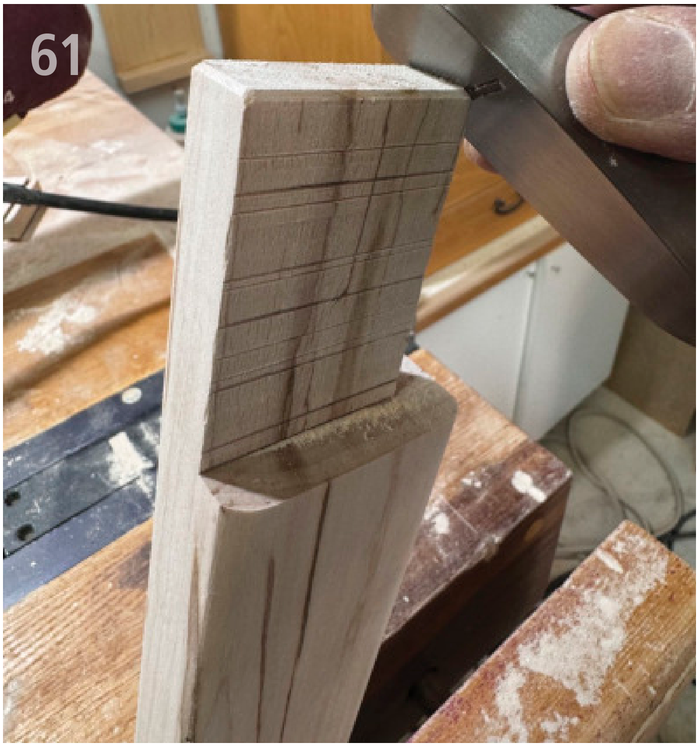

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Well within the reach of a DIYer, a wooden feature wall can be the focal point of a room. BY CARL DUGUAY

letters

Thanks for the free woodworking webinars

A big thanks to *Canadian Woodworking & Home Improvement* for offering these informative and free webinars. Thankfully, a friend of mine pointed them out to me. This couldn't have come at a better time, as about a year ago I decided to get into the hobby of woodworking and I have a lot to learn.

At first, I joined a few of the "free for everyone" webinars hosted by Lara Finley. Since I learned so much, I decided to subscribe to the magazine, in large part so I could watch the "free to members" webinars hosted by Rob Brown. These also didn't disappoint. And as a bonus, I get new print issues delivered to my door. I didn't realize it at the time, but once I became a member, I could also view all of your previous articles on your website. That's kept me busy for the last few months!

Thanks for making it easy for me to learn about woodworking.

Jackson P.
Via email

Measure twice, cut once

Great webinars!

I just wanted to thank you for producing free webinars for subscribers. Being quite new to woodworking, I had no idea a router was such a multifunctional tool. After the webinar I went right out and bought one, along with a selection of bits. If it wasn't for Rob breaking down the different router types for me, not only would I have not known what they did, but I wouldn't know which one to get. I'm now the proud owner of a router combo kit.

Keep up the great work. I'm looking forward to many more webinars.

Sam B.
Via email

Lacking beginner project articles

I'm new to woodworking, having slowly picked up the hobby over the past few years. I'm also a new subscriber. I became a *Canadian Woodworking & Home Improvement* member mainly so I could read the simple project articles and make some of them, as I feel experiential learning is the best way for me to learn.

My first issue (Fall 2024) arrived and I was disappointed to see so few beginner articles in it. I don't have the skills to do any of these projects, other than the tapering jig, though I don't even know where I'd use the tapering jig if I did build it. The coffee table was very complex, the box on the cover is quite intricate, parquetry is far beyond my skill set, the side tables were far too difficult, and the guitar was obviously well out of my range. I was really hoping to see some easy projects for me to build and learn from. Is this the sort of level of difficulty you usually include in your issues?

Jamie P.
Via email

Canadian Woodworking & Home Improvement
36 Hot Products
Know your tools: Power feeder
Workshop respirators
Build a Jewelry Box
Add Parquetry to Your Next Project
Make a Compound Angle Drilling Jig
Build a Stylish Side Table
New Column: What's the Difference?
Top 10 Router Accessories
Remove a Popcorn Ceiling
Create an Acoustic Guitar
Build a Coffee Table with Curved Base

Hi Jamie,

I'm sorry to hear you weren't pleased with your first issue. We try to provide a healthy mix of beginner, intermediate and advanced projects in our print issues. But you're right, our Fall 2024 issue included more intermediate and advanced projects than beginner projects. I hope it's of some comfort to you that there are five beginner / intermediate projects in this Spring 2025 issue.

It can be difficult keeping all our readers happy, as we cater to woodworkers of all stripes. Some of them have been woodworking for decades, while others (like yourself) are new to the craft.

Since you're a member, you can also view our complete back catalogue of projects and techniques. This means that you have over 25 years' worth of beginner projects and skill-building articles at the click of a mouse. Being a member also means you have access to two series of woodworking videos aimed at beginner woodworkers. The first series covers different ways to create 11 essential woodworking joints. These videos generally cover multiple ways to produce each joint, using a mix of hand tools and machines.

The second series is titled "Woodworking Basics: From Design to Finishing" and has 50 videos. As you can imagine, this series contains an incredible amount of information for beginner woodworkers. It will answer many of your questions, not to mention many questions you didn't even know you had. I'd highly recommend bookmarking this series, as there's so much great information there. — Rob Brown, Editor

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Tool Reviews

Work IQ Vise

The ultimate articulating and rotating woodworker's vise. An invaluable tool that improves precision, safety and efficiency in any workshop.

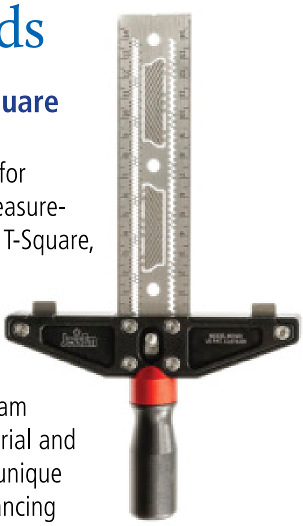
Wagner FURNO 550 18V cordless heat gun

A versatile tool for shop or home. A lightweight, compact heat gun with a myriad of practical uses.

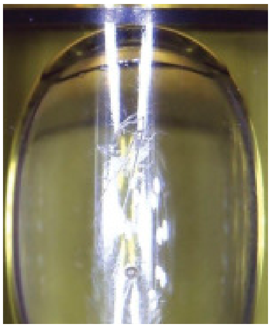
View these reviews and more at: canadianwoodworking.com/**reviews**

Fabulous Finds

JessEm Tool Sword T-Square



A T-square is an essential tool for marking layouts, checking for square and making precise measurements. The JessEm Tool Sword T-Square, crafted from anodized aluminum, is a high-quality precision woodworking tool designed for accurate measuring and layout tasks. Its beam is laser-etched with both imperial and metric scales for versatility. A unique slide button engages two balancing tabs, providing steadfast support during marking and ensuring consistently accurate measurements. It's available in 6", 12", 18" and 24" lengths, with prices starting at $129.99. **Jessem.ca**

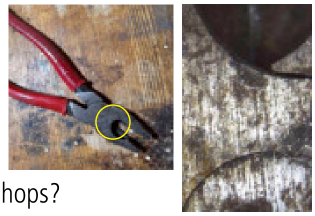


Micro Mystery

Can you guess this object commonly found in most shops?

Follow us on Instagram to see regular "Micro Mystery" challenges.

We will post the answer to this one in our summer issue.

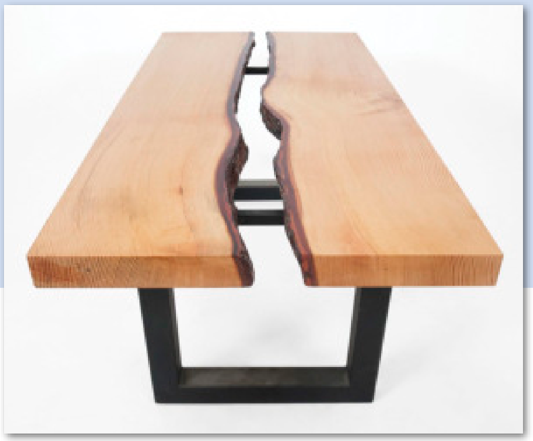


Previous issue: The knuckle joint of a pair of lineman's pliers.

Video Links

canadianwoodworking.com/**videos**

Canadian Quotes: Jesse Toso



Canadian Social Media Influencers

Here's a mix of informative and entertaining social media influencers to check out.

Jackie Toner
Instagram: @the_woodswoman
Woodturning and woodworking personality

Kelsey Powless
Instagram: @powlessandco
Indigenous scroll saw and laser artist

Chris Shison
Instagram: @shisonwood
Unique textured turnings

Rosewood Studio School
Instagram: @rosewoodstudioschool
See what's happening at one of Canada's most acclaimed woodworking schools

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canadiannationals.net

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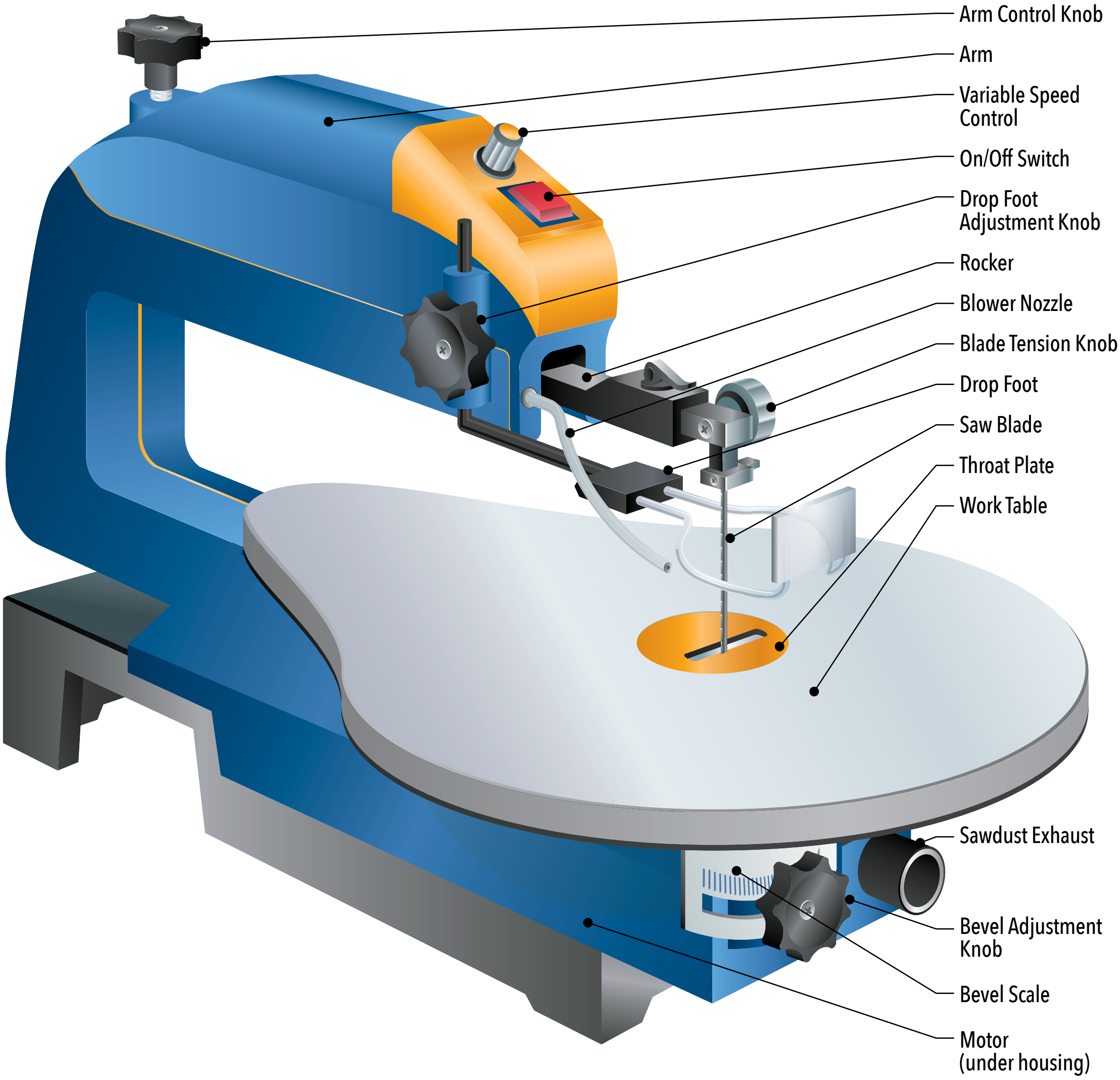
Scroll Saws



A scroll saw is a versatile power tool designed to make precise, intricate cuts in a variety of materials, including wood, plastic and thin metals. It's commonly used by woodworkers, crafters and hobbyists to create detailed designs, curved cuts and intricate patterns that would be difficult or impossible to achieve with other tools.

The scroll saw operates using a fine-toothed blade that moves up and down rapidly, cutting through the material with precision. Unlike a jigsaw or bandsaw, the scroll saw's unique feature is its ability to make inside cuts without requiring entry points. This is achieved by detaching the blade, threading it through a pre-drilled hole in the workpiece, and reattaching it to the saw. One of its standout features is its control. The operator can execute tight turns and follow detailed patterns, making it ideal for fretwork, marquetry and inlays.

Most scroll saws also offer variable speed settings, allowing the user to adjust the blade speed based on the material and complexity of the cut. The table of the scroll saw can usually tilt, enabling bevelled or angled cuts, which adds to its versatility. Its ability to handle delicate work makes it a favourite for projects like puzzles, ornaments and decorative woodworking pieces. Whether you're crafting heirloom-quality items or simple decorative projects, the scroll saw is a reliable tool for achieving precision and creativity in woodworking.

Price: $150 to $5,000
Motor rating: 1.2 to 1.6 amps
Speed: 400 to 2,250 SPM
Throat depth: 12" to 30"

Get the Most Out of Your Scroll Saw

Choose the right blade

Select a blade that matches your material and cut type. Fine-tooth blades are ideal for detailed cuts on thin wood, while coarse blades are better for thicker material. Experiment as needed.

Adjust the tension

Ensure your blade tension is neither too loose nor too tight. Proper tension prevents the blade from wandering or breaking, resulting in cleaner, more accurate cuts.

Keep it firm

Use clamps or a solid hold with your hands to prevent the material from vibrating or shifting during cutting.

Go slow

For detailed patterns, slow down your cutting speed, especially in tight curves. Patience leads to smoother, more precise results.

Maintain your saw

Clean and lubricate your scroll saw regularly to keep it running smoothly. Replace blades as needed to maintain sharpness and cutting efficiency.

Photos by Rob Brown Illustration by Len Churchill

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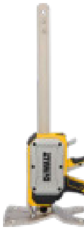

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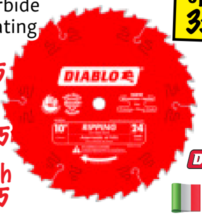

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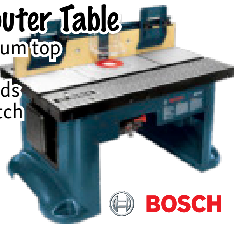

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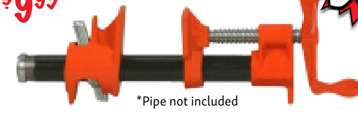

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Top 10 Sanding Tips

Sanding is the first step to obtaining a great finish. Learn tips on how to quickly and easily sand wood so your completed project looks and feels great.

BY ROB BROWN

1 Sand Before Assembly – It's tempting to jump right into assembly once your joinery is complete, but that can make it harder to properly sand interior surfaces and corners. Spending just a bit of time sanding these surfaces before you reach for the glue will save you time, not to mention leave you with a better finish.

2 Remove Glue Before It Hardens – Some woodworkers use a damp cloth to wipe up glue immediately after tightening the last clamp, but I find that risks leaving glue streaks on the workpiece. Leaving it to harden only makes removing it more difficult. Every situation is slightly different, but I tend to let the glue dry for 30 to 60 minutes before using a sharp scraper, blade or knife to remove it. It will be dry enough to not leave glue streaks on the surrounding area.

3 Start with the Right Grit – Sometimes solid wood is extra rough from machining or because of its grain. In these cases, you can start with about 60 grit, maybe rougher. If your solid wood is fairly smooth, you can probably start at about 80 grit. When working with veneer, you can usually start at 100 grit, as the surface is already quite smooth. You also risk sanding completely through veneer if you start with a rough grit.

4 Remove Machine Marks – Ensure the first grit removes all the machine marks from your planer, jointer, table saw, router, etc. After that, each grit will only need to smooth the scratch pattern left by the previous grit.

5 Sanding Power Tools and Machines Are Your Friends – You can hand sand your entire project, but it will take a lot of time and energy. Power sanders will greatly help ease this process. Hand sanding just at the highest grit is also an option.

6 Replace Your Sandpaper When Needed – Sandpaper only works well when there's enough fresh grit on it. Once it gets worn down it stops working and will tend to burnish the wood fibres, rather than cutting them, which will poorly affect the look of the finish.

7 Watch the Edges – As you sand, be more careful around the edges and corners of a workpiece, as the lack of surface area and support may cause you to remove extra wood near these areas. This is especially true when using power sanders and sanding veneer.

8 Use a Light – A raking light will allow you to see any scratches and imperfections on the wood's surface. This is mainly helpful during the final grit, but will help new woodworkers see all the imperfections as they work through the grits.

9 Know When to Stop – Sanding more than necessary isn't added insurance. Not only does it take extra time, but it also causes stain to absorb into the wood less than the stain manufacturers intended. You also risk sanding through a veneered surface.

10 Wear a Dust Respirator – Sanding dust is the finest dust you'll come across in the workshop. This makes it especially dangerous, because it gets farther into your lungs. A dust respirator is a simple approach to keep that dust out. The next step would be a proper dust collection system.

ROB BROWN
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VIDEO: Members can view a recent webinar by Rob about sanding techniques by visiting the Webinars section of our website.

RELATED ARTICLES: Top 10 Great Woodworking Projects for the Outdoors *(Apr/May 2023)*,
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Photo by Rob Brown

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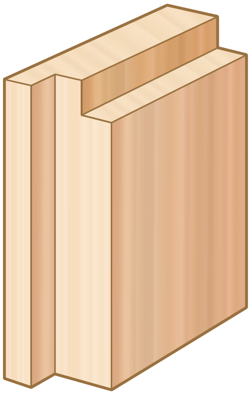
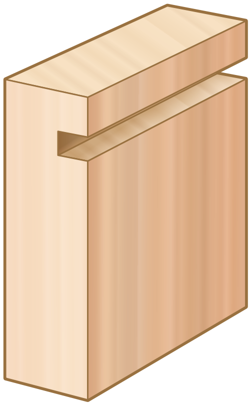
What's the Difference?

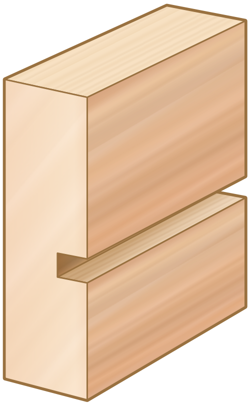
Woodworking tools, terms and techniques can sometimes be confusing. Here, we help you make sense of the finer points of woodworking so you can make the right decision for your situation.

BY CARL DUGUAY

Rabbets, dadoes and grooves


RABBET
(cut at the edge)


DADO
(cut against the grain)


GROOVE
(cut with the grain)

Rabbets, dadoes, and grooves are fundamental woodworking joints that serve as the backbone of many projects. These versatile cuts, created either by hand or machine, play unique roles in joining pieces of wood. Although they share similarities, each has its own distinct characteristics and applications.

A **rabbet** is a cut made along the edge of a board, forming an L-shaped recess. The resulting cut creates two surfaces at a 90º angle, with the remaining protruding section known as the tongue. Rabbets can run either with or across the grain of the wood, making them adaptable to different projects. They're commonly used in box joinery, securing the backs of cabinets or assembling drawers where extreme strength isn't a necessity. For example, the back panel of a bookshelf often fits into a rabbet, ensuring a clean, flush appearance. Simple yet effective, rabbets provide alignment and moderate structural support.

In contrast, a **dado** is a slot or trench cut across the grain of a board. This design makes it particularly well-suited for applications requiring horizontal stability, such as shelving or partitions. When well-fitted, a dado joint offers increased surface area for glue, creating a strong and stable connection. Picture a bookshelf: the horizontal shelves typically sit in dadoes cut into the vertical sides, providing a framework that resists movement and holds significant weight.

A **groove** is similar to a dado but differs in its orientation, running parallel to the grain of the wood. This subtle distinction makes grooves ideal for applications where alignment and grain integrity are crucial. For instance, grooves are often used in frame-and-panel construction, such as cabinet doors, where the centre panel floats securely within grooves cut into the surrounding frame. This design not only holds the panel in place but also allows for seasonal wood movement without compromising the structure.

Dadoes and grooves are often collectively referred to as **slots** because of their similar rectangular shape and function. These cuts can run the entire length of a board or stop at one or both ends, resembling mortises in those cases. This versatility expands their utility, allowing them to accommodate a wide range of design needs.

Creating rabbets, dadoes and grooves can be done with either hand or power tools. Router planes, hand saws, chisels and mallets offer a timeless, skill-intensive approach, while table saws, handheld or table-mounted routers, and track saws bring speed and precision to the process. The choice of tools often depends on the project's scale, the tools or machines on hand, and the desired level of craftsmanship.

For a more detailed description of these joints read "Rabbets, dadoes and grooves" on our website. You can also view our subscriber-only videos "Rabbet Joints" and "Dado and Groove Joints" on our website.

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RELATED ARTICLES: Rabbets, dadoes and grooves *(Dec/Jan 2009)*, Tung Oil: debunking the myths *(June/July 2012)*
VIDEOS: Rabbet Joints and Dado and Groove Joints

Photos by Manufacturers Illustration by Len Churchill

Linseed, tung and teak oil

When it comes to finishing wood, understanding the differences between linseed oil, tung oil and teak oil can help you choose the best option for your project. While linseed and tung oils are plant-based and cure through oxidation, teak oil is a blend of synthetic and natural ingredients, making it a different kind of finish.

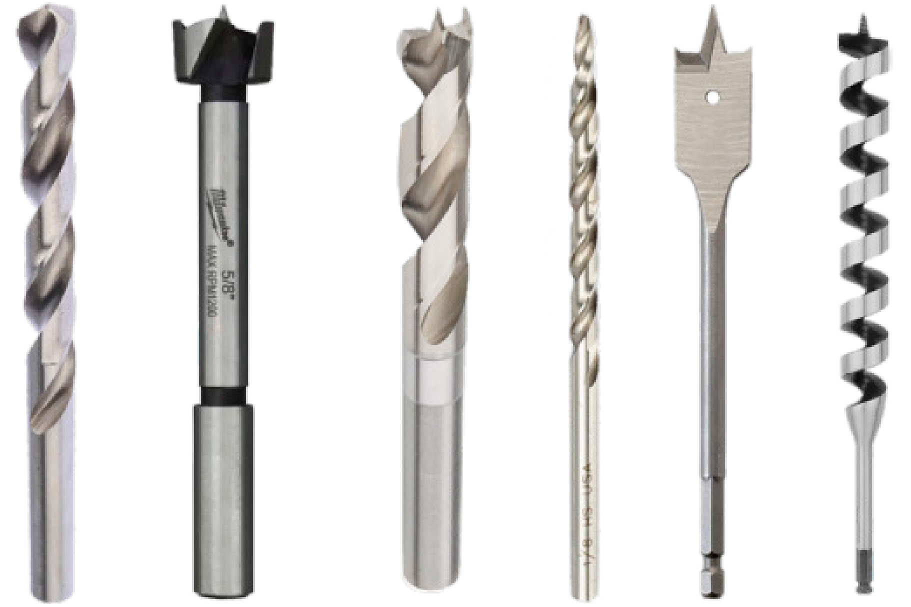
Derived from flax seeds, **linseed oil** is available in three forms, each with distinct uses. **Raw linseed oil** is the least processed form but dries extremely slowly, often taking weeks for a single coat to cure. As a result, it's rarely used as a standalone finish. **Boiled linseed oil** (BLO) is enhanced with drying agents such as petroleum-based compounds or heavy metals. It dries faster than raw linseed oil but is less eco-friendly and safe. **Polymerized linseed oil** (PLO), heated in the absence of oxygen, creates a pure and non-toxic option that dries quickly and leaves a slight sheen with a yellowish tint, especially noticeable on lighter woods. Linseed oil darkens over time, enriching the wood's natural tones but may not provide significant protection against water or wear.

Tung oil is another plant-based finish that cures through oxidation, but it offers some distinct advantages over linseed oil. **Pure tung oil**, applied in multiple thin coats (five to six coats recommended), creates a natural finish with a warm, amber tone. Each coat requires wiping, sanding and up to a week to dry, making it a time-intensive process. **Polymerized tung oil** dries faster and is often enhanced with drying agents for convenience. It produces a harder, more water-resistant finish than linseed oil, curing to a matte or low-satin sheen. Be cautious of products labelled "tung oil," as they may be varnish blends diluted with mineral spirits rather than pure tung oil.

Unlike linseed and tung oils, **teak oil** isn't derived from a single source. It's a commercial term for a variety of finishes, typically blends of mineral oil, linseed oil, tung oil or oil-and-varnish mixtures. Teak oil is formulated to penetrate dense woods, like teak, and enhance their natural beauty. However, its composition varies widely, so check the label for specific ingredients.

For more information about tung oil read "Tung Oil: debunking the myths" on our website.

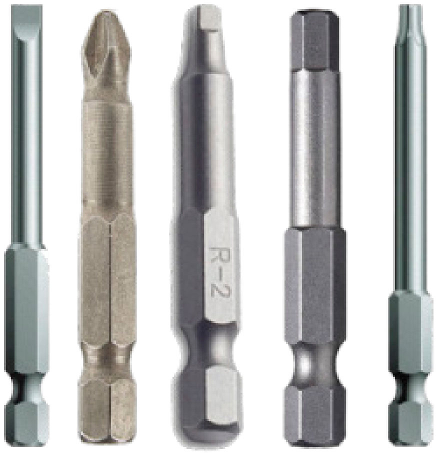
Drill bit and driver bit



Left to right: **Twist, Forstner, brad point, tapered, spade and auger**
Notice how drill bits have a mix of hex and round shanks, depending on their size and how they're typically manufactured.

A **drill bit** is an accessory used with a hand drill, cordless drill/driver or drill press to create holes. Drill bits are designed for specific materials, including wood, plastic, metal and glass, and composite materials like concrete. They come in a wide range of sizes (for specific hole diameters) and lengths. Drill bits are typically made from high-speed steel (HSS), carbide, cobalt or titanium-coated metals. Most can be resharpened using bench grinders or specialized drill bit sharpeners. Woodworkers frequently use several types of drill bits, such as twist bits, Forstner bits, brad point bits, tapered bits, spade bits and auger bits. Drill bits have a mix of circular and hex shanks.

A **driver bit**, also called a screw bit, is used to fasten screws and sometimes nuts and bolts. Screws come in various head styles, including slotted (flathead), Phillips, Robertson (square), hex and Torx. Driver bits are designed to match these screw-head styles and are available in different lengths to suit various tasks. Made from hardened steel to withstand high torque, driver bits are often used with bit holders for better control and convenience. Driver bits generally have hex shanks.



Left to right: **Slotted, Phillips, Robertson, hex and Torx**
Notice how driver bits all have hex shanks.These shanks fit nicely into either a bit holder that's chucked into the jaws of a drill / driver or directly into a hex chuck of a drill / driver.

Bit Holder - A bit holder is a great way to allow quick and easy changes between any driver bit or drill bit, as long as the bit has a hex shank.

CanadianQuotes

Jesse Toso

…on sketching, sharp tools and his love of sanding.

BY ROB BROWN

How long have you been building furniture?

I've been working with wood for over 30 years. My dad is a carpenter and I spent many hours in his shop and on jobsites learning the trade. Carpentry put me through university and I have built several houses on Vancouver Island.

What sort of furniture do you specialize in?

I like to work with solid wood pieces, generally repurposed or salvaged wood.

Tell us a couple interesting things about your personal life.

I was on the TV series "A Cut Above," a reality show with 12 international chainsaw carvers competing for $50,000. I spend my summers travelling to various chainsaw carving events around the world.

In order, what are the three most important items in your shop apron?

I don't wear an apron, but I will always have a pencil in my pocket, my graph paper sketchbook and a tape measure within reach. If I can draw it, I can create it.

Do you prefer hand tools or power tools?

I generally use power tools for most of the process for speed and efficiency, but there is no replacing sanding by hand.

Solid wood or veneer?

Definitely solid, although I have recently been exploring the possibilities of laminated plywood.

Figured wood or straight grain?

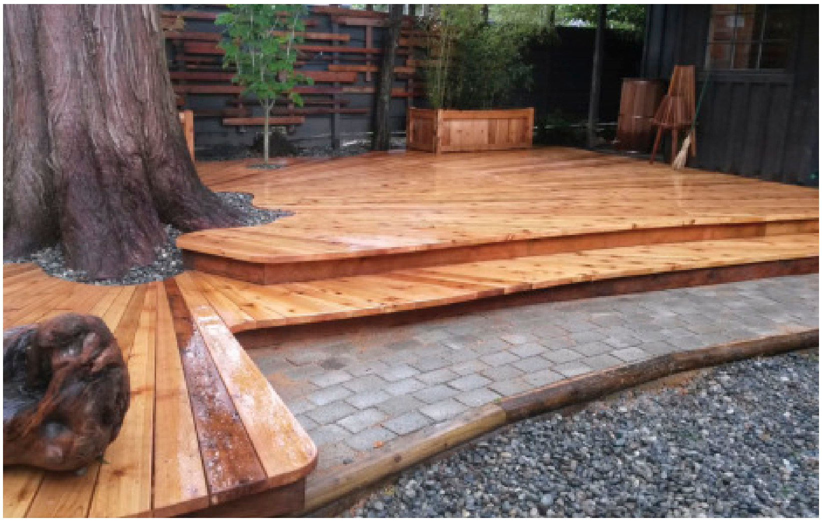
Figured grain is more interesting, but straight grain has its place.

Flowing curves or geometric shapes?

I like to incorporate flowing curves in most of my sculptural work. However, contrasting geometric lines with the natural flow of the grain can make for some dynamic pieces.

Favourite wood?

Western red cedar.



Cedar Deck – Toso was given full freedom to design and build a deck to join two cabins on Bowen Island. He wanted to accent and honour the giant cedar tree the deck was to surround. He was able to fan the boards out from a central point within the tree and keep the angles consistent.

Photos by Jesse Toso (Lead Photo by Trevor Cornish, TMC Photography)

Jesse Toso, 50, Toso Wood Works, tosowoodworks.com

Location & size of studio — Studio #101-1000 Parker Street Studios, Vancouver. A 200-square-foot work space within a larger shared woodworking shop of artists' studios

Education — Simon Fraser University, BA in visual arts

quotes

I share a giant shop with a dozen other woodworkers in a building full of artists. I have about 200 square feet that I can call my own.

* * *

If I feel like a work routine is forming, I will often change gears and work on something else. I always have several projects on the go at a time. I will work mostly in the afternoons and evenings. I enjoy working late when I can have the entire shop to myself and work at my own pace.

* * *

Contrary to most woodworkers, I actually enjoy sanding. I'm obsessed with wood grain and sanding is what really exposes the grain. I have a couple of electric 1/2" belt sanders that I use daily.

* * *

Inspiration comes from everywhere, but it often comes from the grain of the wood itself.

* * *

I grew up on Vancouver Island surrounded by trees and have always had an affection for them. I want to honour the tree in every piece I create.

* * *

Once I have a concept in mind and the wood to work with, I will make several sketches on graph paper to resolve any proportion issues and get an idea of what the piece will look like. Using the scale drawings, I'll then transfer the lines onto the wood and start cutting.

* * *

Make what you love to make. That love will show in your work and that is what will make you and your product stand out.

* * *

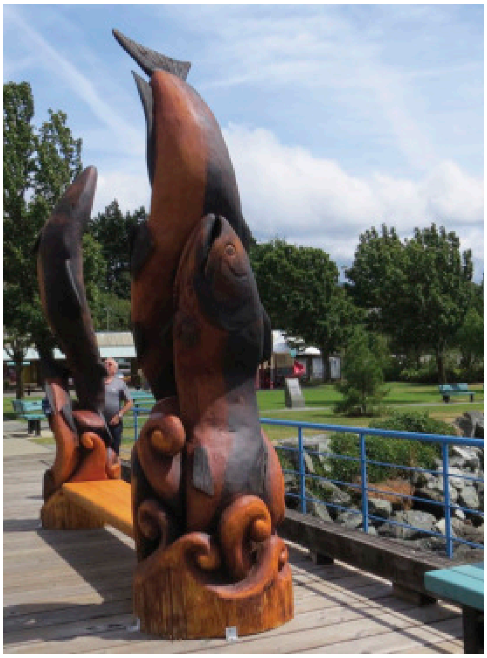
It is in our failures where we learn the most. I like to push the limits of what wood can do and sometimes a few too many cuts across the grain makes the piece fragile and it comes apart. This is a benefit to making prototypes.

* * *

Keep shop class in schools. Give children opportunities to make something with their hands.

* * *

I am quite material driven. Design is important, but it's based on how it uses the material. For instance, how does the design use the grain? With my construction background, I am fascinated by four building materials: wood, metal, glass and concrete. I like to incorporate combinations of these materials.



Salmon Bench – Toso was commissioned by the city of Port Alberni to carve large salmon from a western red cedar log to make a bench on the pier.

I am definitely a pencil and paper guy. I will draw a piece from all angles and determine how it will come together. I make scale models for some of my larger projects.

* * *

I like to have artistic freedom, but within parameters. Good design allows for change throughout the process while still maintaining true to the original concept.

* * *

I love the drawing part of the process. I enjoy figuring out how the pieces fit together and resolving any issues before cutting into anything.

* * *

I am motivated by the reactions my work evokes on the public/client. It brings me great joy watching someone experience my piece, whether it's sitting in a really comfortable chair I've made or being startled by a giant carved wooden spider on the ceiling of my shop.

* * *

Keep your tools sharp.

ROB BROWN
rbrown@
canadianwoodworking.com

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VIDEOS: To view a slideshow of Toso and his work, visit the Videos section of our website.
RELATED ARTICLES: Alex Low *(Aug/Sept 2022)*, Melanie Hamilton *(Dec/Jan 2023)*

HOW TO CHOOSE A WOOD FEATURE WALL

Lead Photo by 1benmu.com
Illustrations by Len Churchill

When thoughtfully chosen and installed, a feature wall made of wood panelling can enhance both the aesthetics and functionality of any room in your home.

BY CARL DUGUAY

Interior wood wall panelling is a versatile design element that brings texture, style and character to virtually any room in your home. It also offers some other functional and practical benefits. When properly installed and maintained, wood panelling can last for decades, resisting dents and scratches better than drywall. An avid DIYer should have no problem with this project, while even a relatively new DIYer can set themselves up for success easily with a sound approach and a few tools.

In living rooms, it adds warmth and flair, creating a cozy, inviting atmosphere. In dining rooms and kitchens, panelling elevates the room's visual appeal and formality. When installed at chair-rail height, it also protects walls from scuffs and wear. In bedrooms, panelling creates a calming ambiance, especially when finished with a soft sheen or muted stain. In bathrooms, it offers a blend of charm and luxury while protecting walls from moisture, particularly around bathtubs or sinks. In high-traffic areas like hallways, entryways or mudrooms, panelling not only adds visual interest to otherwise plain spaces but also shields walls from everyday wear and tear.

Types of panelling

Shop-made wall panelling is typically made of individual boards or a combination of boards and plywood panels. You can also purchase commercially made panelling consisting of solid wood, hardboard, MDF, PVC or a combination of these materials. For an eco-friendly, unique aesthetic you could use reclaimed lumber in your panelling.

Some types of panelling, such as shiplap and tongue-and-groove, consist solely of boards, while others combine boards with panels (typically plywood). For DIYers, it's best to purchase pre-milled boards unless you have the tools and skills to mill and profile the boards yourself. Pre-milled boards from building-supply centres are commonly available in pine or cedar and come in a limited range of widths. These boards often require sanding before painting or staining. Specialty lumber dealers typically offer a broader selection of wood species and widths.

You can install panelling flush to the ceiling or floor; make sure to leave an expansion gap of about 1/8" to 1/4". Alternatively, it can be installed on the lower half or three-quarters of a wall, known as wainscoting. For a more refined appearance, consider adding cap trim to the top edge and a lower rail and shoe trim to the bottom.

Choosing the right panelling style depends on the design of your space, your budget and the functional needs of the room.

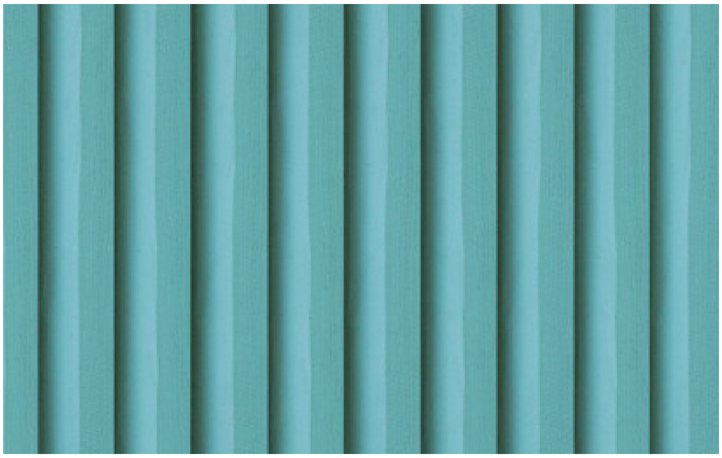
There are a few caveats when it comes to wood panelling. Wood requires regular care, such as dusting and occasional refinishing, to keep it looking its best. It's also susceptible to moisture damage if not sealed properly. Panelling can make small rooms feel even smaller or darker if not balanced with other design elements. Remember that wood never sleeps. Changes in humidity and temperature can cause wood to warp or shrink if not properly installed and regularly maintained.

Here are some of the more common types of interior wall panelling. As you'll see, the joints that allow the different panels to fit together are likely the most defining feature of the different types.

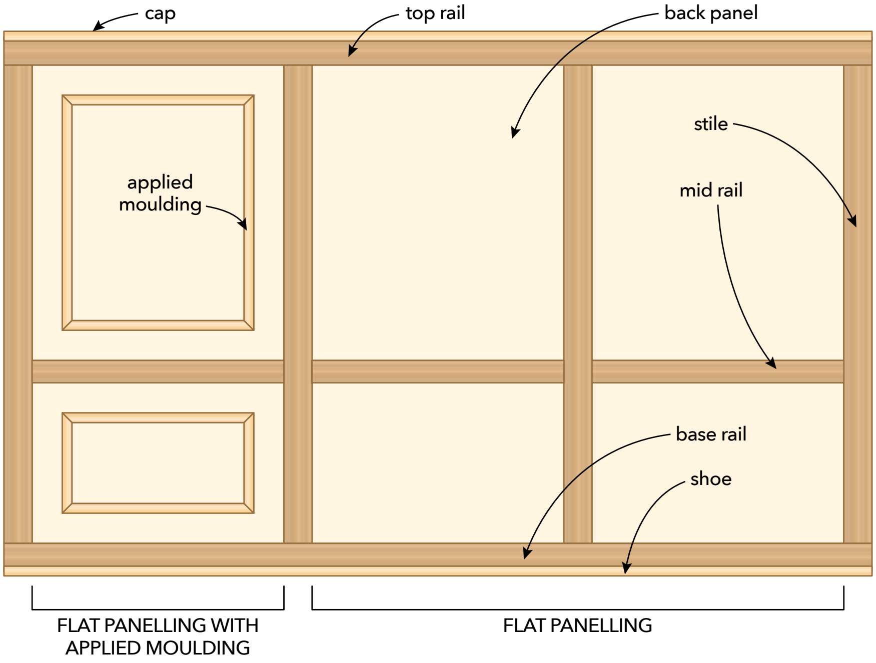
Shiplap panelling is characterized by its unique rabbeted edges that allow the boards to overlap slightly, creating a distinctive horizontal or vertical groove between each plank. This design makes shiplap visually appealing and functional for many spaces. While shiplap panelling is quite easy to install it can warp if not properly installed, particularly during periods of high humidity. It requires periodic cleaning to prevent dust and dirt from collecting in the gaps between the boards.

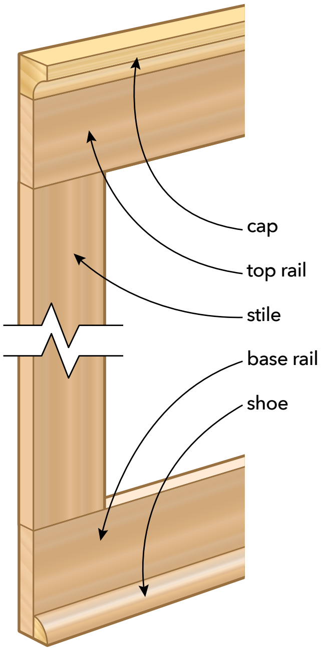
Tongue-and-groove panelling consists of boards with interlocking edges (a tongue that fits into a groove) for a seamless, secure connection with no visible gaps. The interlocking design simplifies the installation process. Boards can be bevelled along the

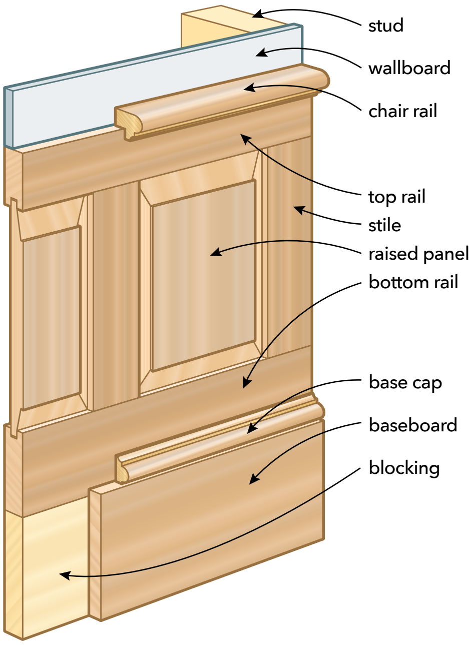
Many Functions – Wall panelling of any kind can help add a visual detail to an otherwise dull space. Framed nicely, this approach helps define the area, in addition to providing some protection from daily use. Wood panelling is much more durable than drywall. (Photo by Irina88w, Dreamstime.com)



Shiplap – Although some shiplap will look much flatter than this, shiplap panelling can come in a variety of looks. The one thing that remains the same is that each piece gets overlapped by the next piece you install. (Photo by AdobeStock.com)







lengthwise edge (V-groove) or unbevelled (known as flush joint or square edge) and can be installed vertically or horizontally.

Beadboard panelling consists of narrow boards with a distinctive ridge (bead) between each board. The boards are usually joined by tongue-and-groove joints. Beadboard is frequently used in wainscoting and provides a classic, traditional look. Beadboard is available in a variety of styles, from simple and understated to ornate and decorative. It's one of the styles that's commonly available in 4' × 8' engineered wood panels.

Board-and-batten panelling is made from wide boards separated by thin strips (battens). The battens can also be placed over the gaps left between the boards, allowing the boards to move with the seasons, yet cover any unsightly gaps. It's associated with a cottage or farmhouse look. You can modify board width and spacing for a customized look. As with tongue-and-groove, it's both slightly more expensive and more time-intensive to install, and it requires precise measurements to ensure a symmetrical appearance.

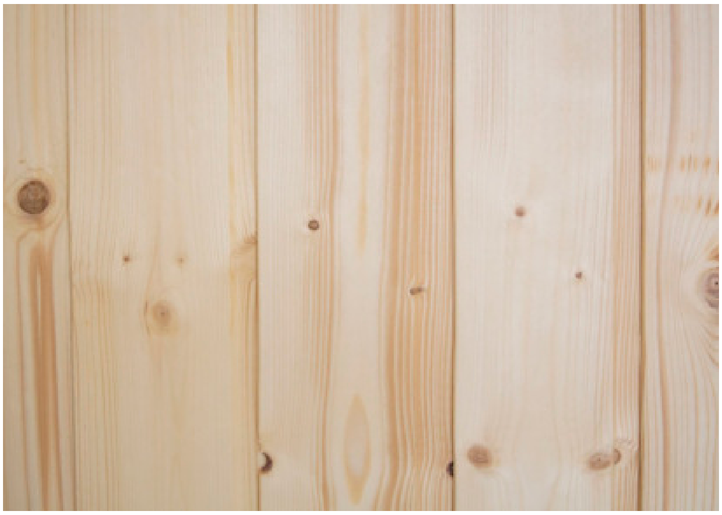
Rail and stile panelling adds depth and visual interest to a room. In addition to the series of horizontal rails and vertical stiles that frame the edges of the area and divide the wall up into smaller, visually pleasing sections, panels are added between the rails and stiles. The joints securing the rails and stiles are commonly mortise and tenons, though similar joints like cope and stick can also be used. The panels are secured in place by protruding into grooves machined in the edges of the rails and stiles. The panels can have either raised centres or are completely flat. Raised panels create a three-dimensional effect, making the wall more dynamic and luxurious. This is the most expensive and complex type of panelling to install. Like beadboard, it's often used in wainscoting.

Slat-on-panel panelling consists of simple, flat panels as a base. Solid wood slats of any thickness, width, length or species can be attached to the faces of these panels to provide a strong visual. It's also possible to leave the slats off the faces of these flat panels, to create a smooth and minimalist look. These panels are often made from materials such as MDF, plywood or PVC. It's even possible to use milled lumber as the flat panel and attach one or many pieces directly to a wall. Slat material is typically solid wood. Flat panelling is typically cost-effective, quick to install, and easy to clean and maintain. However, if not executed thoughtfully, it can lack texture and visual depth, potentially appearing plain in large spaces without additional decor. Adding decorative moulding to the panels can enhance their appearance, giving them a more elaborate look.

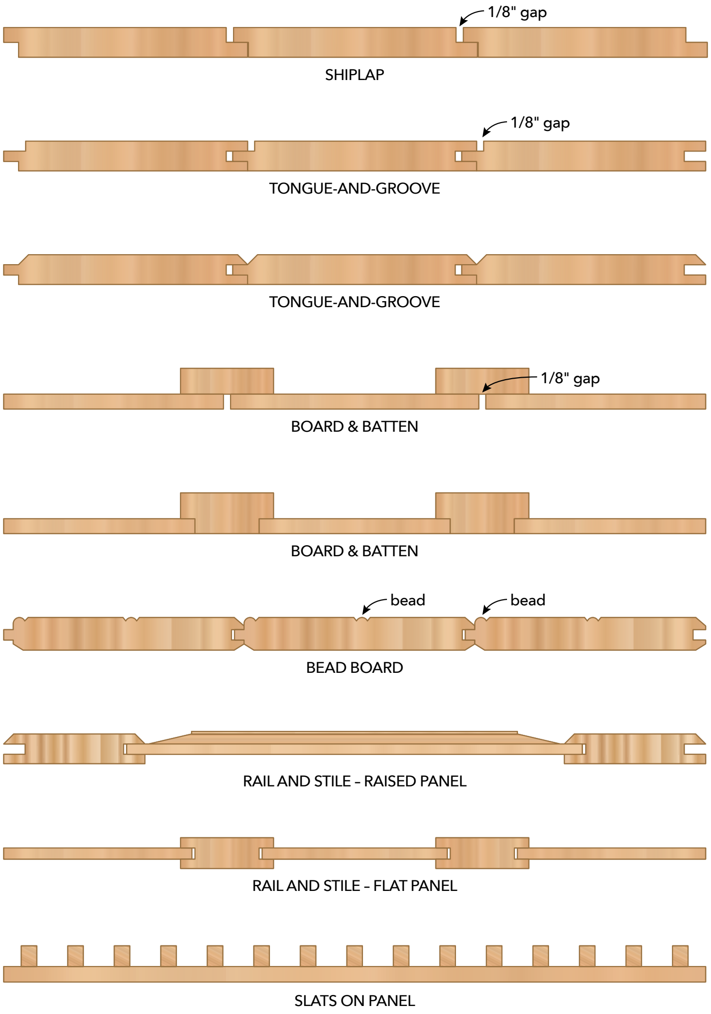
Tools and tips for installation

Installing wood wall panelling can be a DIY-friendly project, but it does require some basic carpentry skills and tools. The difficulty level can vary depending on the type of panelling and the complexity of the installation. Having the right tools ensures your project is efficient and professional-looking.

You'll need a few basic hand tools like a level, chalk line, measuring tape, stud finder and caulking gun. You'll also need construction adhesive. To cut the boards you'll need a hand, table, mitre or track saw. For installation, you can use a nail gun and fasteners or drill/driver and screws. If you choose the latter you'll want to cover the screw holes, either by applying trim on top of the area with screws, plugging the holes with glue and plugs, or some sort of filler / compound.



Tongue and Groove – Some shiplap and tongue and groove designs can look virtually identical once installed, like this tongue and groove installation. The difference is only in how the different segments of wood mate with each other. (Photo by Mvhelena74, Dreamstime.com)


1/8" gap
SHIPLAP
1/8" gap
TONGUE-AND-GROOVE
TONGUE-AND-GROOVE
1/8" gap
BOARD & BATTEN
BOARD & BATTEN
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BEAD BOARD
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RAIL AND STILE - FLAT PANEL
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Wainscoting and panelling – what's the difference?

While wainscoting and panelling involve using decorative panels to cover walls, they differ in terms of their scope and purpose. **Wainscoting** covers the lower portion of a wall, usually up to chair rail height, but sometimes higher. Its purpose is primarily decorative, adding visual interest and a touch of elegance to a room. It can also protect walls from damage. **Panelling** can cover entire walls or even ceilings. It's more functional, often used to improve insulation, reduce noise or hide imperfections in the wall.

Regardless of the type of panelling you choose to install, if your walls are uneven or require significant preparation, the installation will be a tad more challenging. If this is the case you may need to shim the panels during installation.

Begin by measuring the area to calculate the square footage to be panelled. Make sure to add about 15% extra for waste or mistakes. Wood expands and contracts with changes in temperature and humidity, so let the material sit in the room you'll be panelling for a couple of days before installation to acclimate to the environment. Your next step is to prepare the wall by removing any obstacles like outlet covers, switch plates and baseboards, and then cleaning the wall surface. Use a stud finder to locate and mark the studs.

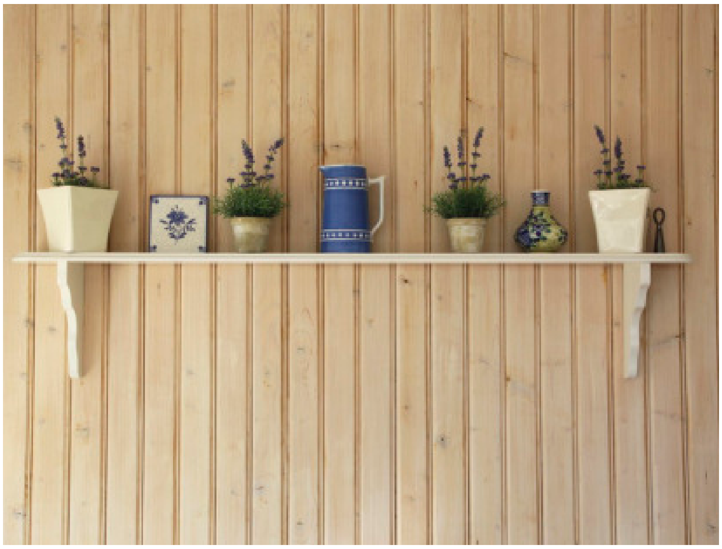
Double check all your measurements before cutting. It's a good idea to lay out the panels to ensure they fit correctly and adjust if necessary. At this stage you can paint or stain the panels. Alternatively, you can apply a finish after installation.

Generally, it's best to begin installing the panelling from a corner and work your way around the room. You can use either nails, screws or construction adhesive to secure the panels to the wall. Just remember that nailed or screwed panels can be more easily removed if necessary. As you install, use a level to ensure the panels are straight and adjust as needed. Remember the adage that wood never sleeps and leave a small gap (about 1/8") at the edges to allow for wood expansion.

Finally, it's a good idea to caulk any visible gaps between seams to create a clean, finished look. Once the panelling is installed and the caulk has dried, reattach baseboards or trim and replace outlet covers and switch plates for a polished look.

Finish before or after installation

Applying a finish to your panelling can be done either before or after installation, depending on your specific circumstances and preferences. Regardless of the approach, consider sealing the panels before installation by applying a sealer or base paint coat to ensure dimensional stability. Applying a stain and topcoat finish before installation is ideal for panelling with complex profiles or grooves, as it's easier to ensure full coverage, especially on edges and ends that may be hard to reach once installed. Finishing panels before installation also allows you to better control drips, runs and overlaps since the panels can be laid flat. However, if you'll be painting the panelling, it might be better to do so after installation. This approach ensures a seamless finish, allowing you to fill any gaps and achieve consistency across joints.



Beadboard – Very similar to many tongue and groove approaches, beadboard's main defining factor is the fact that it has a bead machined into its face, right beside the joint. The joint is typically a tongue and groove. (Photo by AdobeStock.com)

Solid wood or sheet goods?

When choosing between solid wood and sheet goods for interior wall panelling, both have distinct advantages and disadvantages. Solid wood offers natural beauty with unique grain patterns and textures, making it an excellent choice for those seeking a high-end aesthetic. It's durable, customizable and can be refinished or repaired if damaged. However, solid wood tends to be more expensive, is prone to warping or shrinking with humidity changes, and can be heavier and more challenging to install. It also requires proper sealing to maintain stability.

On the other hand, sheet goods like plywood, MDF or particleboard are cost-effective, dimensionally stable and easier to install due to their light weight and large sheet sizes. They're versatile and can be finished with veneers, laminates or paint to achieve a variety of looks. However, sheet goods lack the natural depth and beauty of solid wood, and their surfaces may wear or chip over time. They're less durable overall, harder to repair if damaged, and may contain adhesives that release VOCs, making them less eco-friendly than sustainably sourced solid wood.

Ultimately, solid wood is ideal for projects where natural aesthetics and durability are key, while sheet goods are better suited for budget-conscious projects requiring stability and versatility. A hybrid approach, such as using sheet goods with solid wood, can combine the best of both options.

CARL DUGUAY
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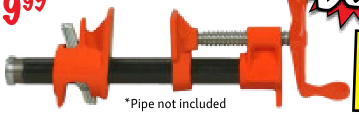

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A Toy Box to Last Generations

Help keep your living room organized with a toy box made from cost-effective, plentiful construction-grade lumber.

Photos by David Takeda
Illustration by Len Churchill

BY DAVID TAKEDA

Building a toy box can be a rewarding woodworking project that combines creativity with craftsmanship. This toy box measures 36" wide, 20" deep and 16-3/4" high, with a lid featuring an additional 3/4" overhang on the front and sides to minimize finger pinching. I used #2 SPF 1" × 6" × 8' boards, which were relatively straight and flat. I needed six boards, plus a piece of 1/2" plywood I had on hand measuring about 36" × 20" for the bottom.

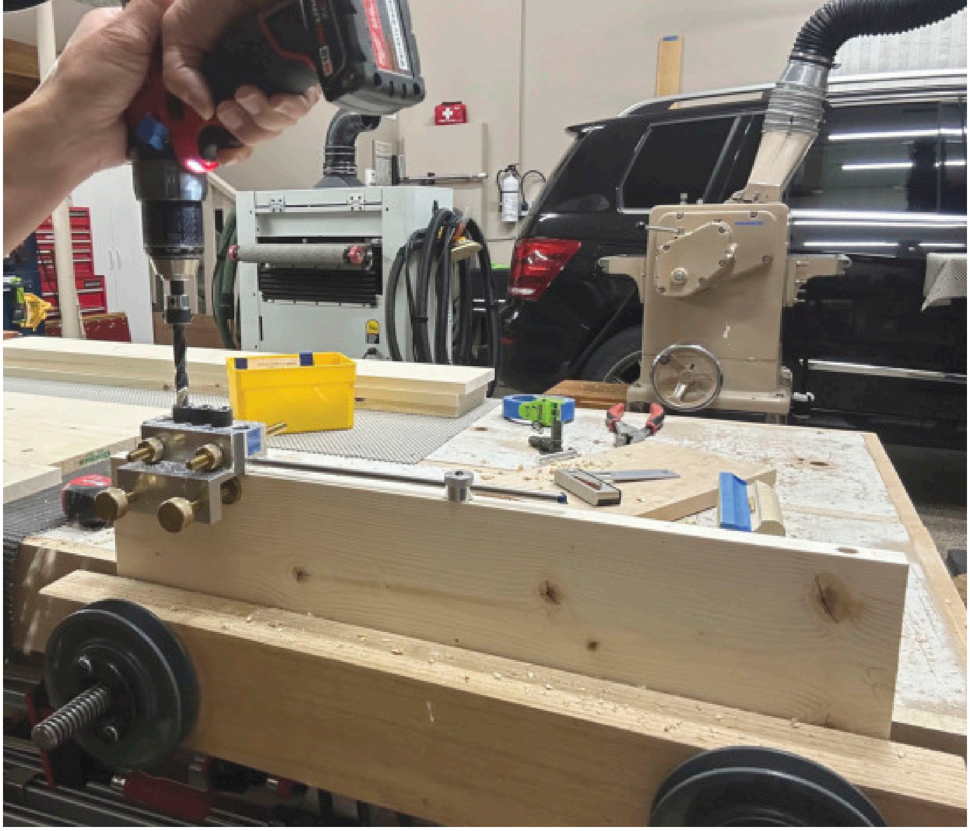
Cutting and preparation

I started by cutting five of the boards, each yielding two pieces at 38" and one piece at 20". This gave me 10 pieces at 38" plus five pieces at 20", short one 20" piece for a side wall that was cut from the sixth board. All of these measurements are long by at least 1". Making strategic cuts at 38" allowed me to choose any board for the front panel or the wider lid. This helped ensure optimal grain alignment, enhancing the toy box's appeal. If your material has some splits at an end, you can either reduce the overall length or width of the toy box, or cut the splitting off the end first, and use another piece of lumber.

Securing and milling

Prior to milling, I addressed any weaknesses in the wood by using black CA glue to secure the knots and cracks. This not only stabilizes the wood but also enhances its appearance, as the black CA glue highlights rather than conceals the knots. I let the glue cure overnight, then levelled excess glue with a block plane. If you're not concerned about filling the knots in your project, you can skip this step, though be aware of any loose knots as you build; because you don't want any to come loose as you're machining them.

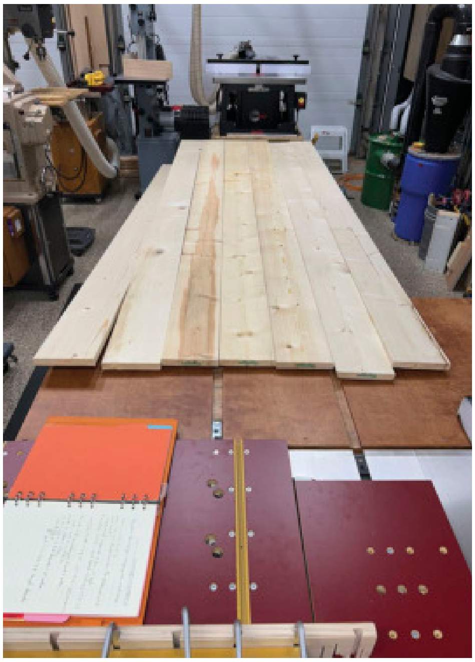
Milling began by dressing one face and squaring one edge on a jointer, then planing the boards to their finished thickness to achieve parallel faces. It's easier to plane them to final thickness now, as the narrow parts will all fit through a thickness planer. Waiting until the planks are laminated into one wide panel means you need a wide thickness planer to dress them to final thickness. A note about the final thickness of the parts: you can leave these parts thicker if you'd like.



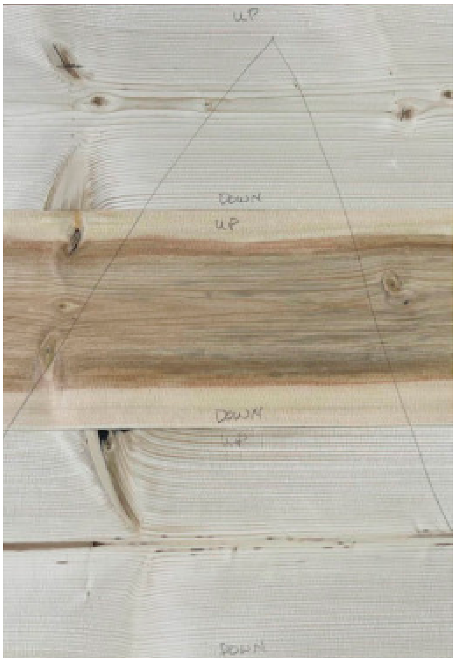
Dowels for Alignment – Dowels won't increase the strength of a joint, but they will help the joints come together more evenly. Dowels also keep the boards from moving around during glue-up, which makes that step much smoother. A dowel jig will make this process faster and easier, though a simple shop-made jig or dowel centres are a cost-effective way to align and drill dowel holes.

Panel assembly

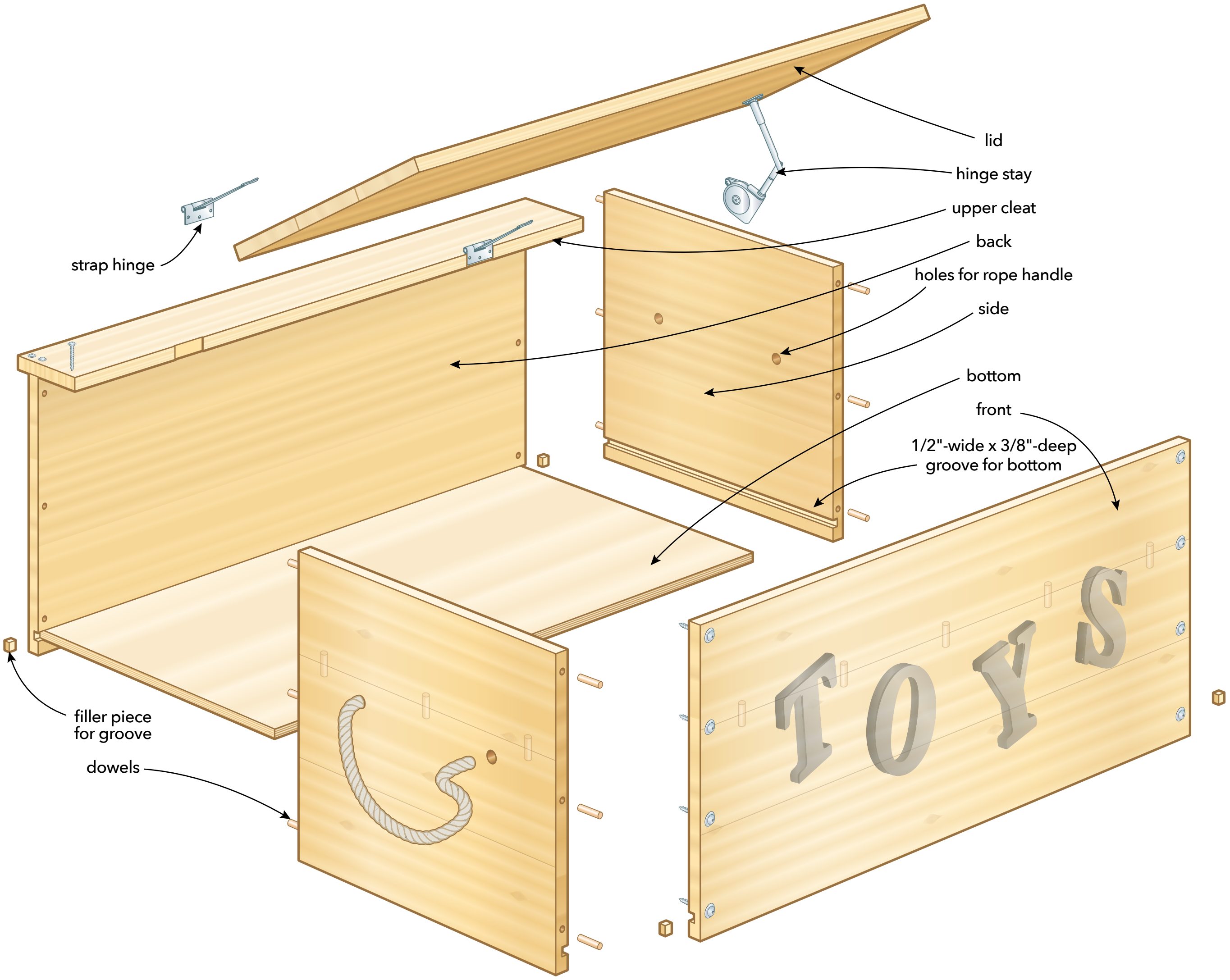
Trimming the board edges for the box and lid panels came next. I arranged the 10 38" boards to best highlight the lid and front panel. Any defects in the boards were hidden on the inside of the box, where possible, so I didn't have to mill all the defects



Select and Organize – Take a close look at the lumber you have on hand. Saving the best pieces for the front and leaving the worst pieces for the back will leave you with an attractive finished project.



Mark Them Up – Adding a cabinetmaker's triangle on the boards, or even just numbering and labelling them, will help you reassemble the individual boards into panels in the best looking way.


lid
hinge stay
upper cleat
back
holes for rope handle
side
bottom
front
1/2"-wide x 3/8"-deep groove for bottom
strap hinge
filler piece for groove
dowels
TOYS

out, thereby keeping the boards as thick as possible. Next, I drew a triangle on each panel and took pictures to aid in keeping the same position of each board through glue-up. I also wrote on opposing edges of each board alternating the word "up" or "down" to indicate which way the board would be final-trimmed. By alternating the face of the boards up and down on the table saw, any discrepancy in the blade being square to the table is negated when the boards are glued and the joints appear seamless.

Before gluing the boards, I used 3/8" × 1-1/2" diameter dowels to aid in edge alignment. The dowels don't add any strength to the joint unless you have a poorly fitting joint. My Dowelmax jig has served me well for a decade. Like any tool, a learning curve is required but the reduced stress when gluing is

Clamp the Panels – With the dowels in their holes and glue on the joints, a few clamps will bring the boards together until the glue dries.

Scrape It Off – Scraping the glue once it's partially dried, but before it's fully cured, is a good way to remove the excess without smudging it all over the panels. This plastic scraper blade works well to avoid damage to the wood surface.

Materials List

Part	Qty	T	W	L	Material
Front	1	3/4	16	36	SPF
Back	1	3/4	16	36	SPF
Sides	2	3/4	16	18-1/2	SPF
Top	1	3/4	16	37-1/2	SPF
Upper Cleat	1	3/4	4-3/4	37-1/2	SPF
Bottom	1	1/2	To	Fit	Plywood
Letters	1	1/2	To	Fit	Plywood, MDF or Solid

Hardware List

Name	Qty	Size	Details	Supplier
Brass Strap Hinge	2	6 3/8"	Part #00H6801	Lee Valley
Soft Down Flap Stay	1		Part #00T0210	Lee Valley
GRK Screws	26	#8 × 1-1/2"		Misc
Rope	2	1/2" × 27"	White Nylon Rope	Misc
MDF Letters (optional)	4	5"		Amazon

worth it to me. Other dowel jigs, or even dowel centres, could also be used.

Three dowels per joint were used on the shorter side panel boards and five dowels were used on the front, back and lid boards. Locate the dowels so they remain hidden in the panel, rather than become visible when the panel ends are trimmed to length after glue-up.

Lid details

I glued only three of the four boards for the lid panel, as the fourth board is screwed on top of the box, flush with the rear of the box. This reduced the size of the lid so the hinges and hinge stay don't have to carry as much weight. This also makes the lid smaller and lighter for little kids to lift, and gives about 4" of room for the lid to open before hitting a wall behind the toy box. The hinge stay holds the lid open past 90° so it will not come down on a little kid. This slow-close hinge stay from Lee Valley is the best I have found. My grandkids' toy box lid still closes slowly after five years.

Drill dowel joints

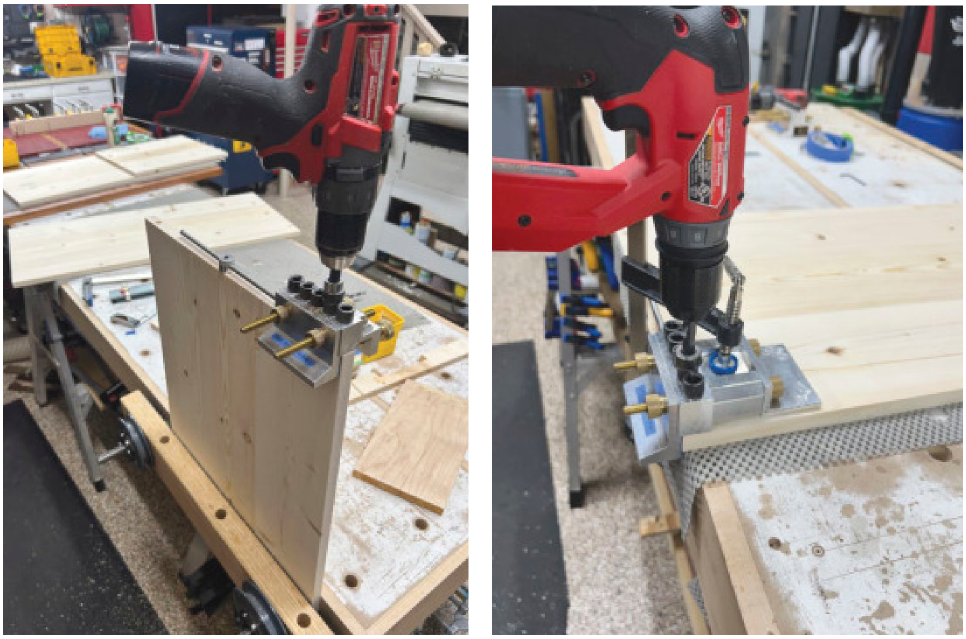
Once the individual panels were glued up, I trimmed the ends of each panel to width, taking into account any flaws that could be cut off. I then drilled more 3/8" diameter dowel holes on the ends of the side panels and on the face of the mating front and back panels. These were drilled so they wouldn't protrude past the outer faces of the front and back panels, yet would collectively accept a 1-1/2" long dowel. These dowels ensured the corner joints would be easy to position in the rush to glue and clamp the box square, as well as keep the corners secure for a long time. Just be sure not to bore the holes in the front and back panels so deep they protrude out the show face of the workpiece.

I used a card scraper to clean up any remaining glue where the clamps sat, as well as level the joints. It's mainly the inner faces that need to be taken care of now, as the outer faces can be smoothed once the project is together. I then sanded the panels on my drum sander to level the faces. Most woodworkers don't have a drum sander and if that's the case for you, you could use a belt sander, a hand plane or a random orbital sander. You just want the faces of each panel as flat and smooth as possible.

After my drum sander, I followed with a 6" ROS to clean up any surface marks from the drum sander.

A bit more machining

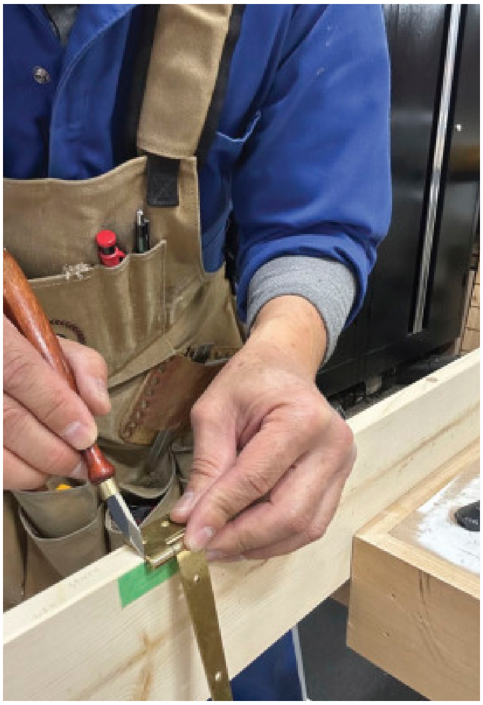
Before assembling the panels, I used a dado stack to cut the 3/8" deep grooves for the 1/2" oak plywood bottom. This leaves two square holes at either end of the box where the grooves in the front and back exit the sides. Though you can leave the holes as-is (which is what I did), two ways around this problem are to cut four small blocks of wood to glue in the holes after assembly, or to stop the groove in some way. This could mean stopping the groove on the table saw, then using a chisel to remove the rest of the material up to about 1/2" from the ends of the fronts and backs, or to use a router equipped with an edge guide to machine the grooves, and make sure to stop



Drill Dowel Holes – Takeda uses his Dowelmax jig to help him bore the holes in the ends of the sides, as well as the inner faces of the front and back. When boring the mating holes in the front and back (right), make sure not to drill the holes so deep that they exit the visible face of the panels. A stop collar on your drill bit will assist with that.

Bottom Groove – A groove in the inner faces of the front, back and sides will accept the bottom. Machine the groove on a table saw or with a router. If you start / stop machining the groove so it doesn't protrude out both ends of the panel, the groove won't show in the final project. However, it's much easier to machine a through groove, and it's also possible to fill the square hole after assembly. Leaving the small square hole is also an option, which is what Takeda chose to do.

Round It Over – Takeda routed a small round over on all the exposed corners in order to reduce splinters.



Install the Hinges – Takeda locates the hinge, then scores the fibres of the wood on either edge of the leaf. He can then use that mark to help him create the mortise for each hinge.

machining the groove before the ends of the front and back panels.

Finally, use a router and bit to rout a 1/8" round over to ease all exposed edges.

A word about adhesives

My glue of choice is regular wood glue, but the main challenge with it is its short open time. Depending on the type, it can start to dry in as little as 10 minutes. For most assemblies this isn't a problem, but for assemblies that are larger or more complex I turn to Old Brown Glue, a hide glue, as it has a longer open time of up to 30 minutes. No heat or mixing required.

Another option is to assemble the project in sub-assemblies. This involves only applying glue to some of the joints, then bringing some, or even all, of the project together to dry. Then, when the glue has dried, you can remove the non-glued parts, apply glue and re-assemble them. Just be sure that you glue the first group of parts up so the non-glued joints can be dis-assembled and have glue applied to them.

In the case of this toy box, you could glue the back panel to either one or both of the sides first, then let those joints dry before finishing up with the other parts. If you glue up both the front panel, back panel and one side panel, you can't flex the front and back panel away from each other to remove the non-glued side panel in order to add glue to it. Just think through the process before starting a sub-assembly.

Box glue-up

It's helpful to clamp the box through a dry run before glue is applied to figure out the best process for assembling the box, determine which clamps go where and to make sure the box can be clamped square.

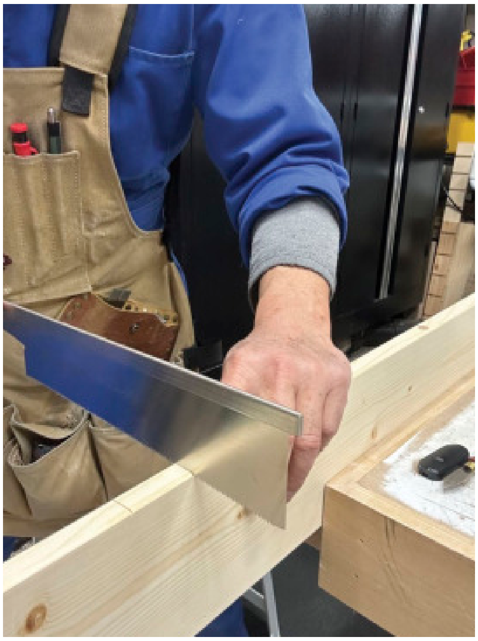
When glue is put into the dowel holes, I use a 3/8" bolt to squish the excess glue out of the hole so there is little to no squeeze-out when the dowel is inserted. This also helps to spread the glue on the inner surfaces of the dowel hole. Although this works very well to ensure full glue contact, it does take a bit more time which slows down assembly.

Once you have all the things you'll need nearby, proceed with applying glue into the dowel holes, as well as adding some glue to the ends of the panels. Bring the parts together and apply clamps. Cauls between the clamp pads and the workpieces will prevent denting the wood surface. Check the box for square and let the glue dry. Once dry, remove the clamps, scrape off any glue squeeze-out and, if you opted to glue the toy box up in sub-assemblies, glue up the rest of the parts.

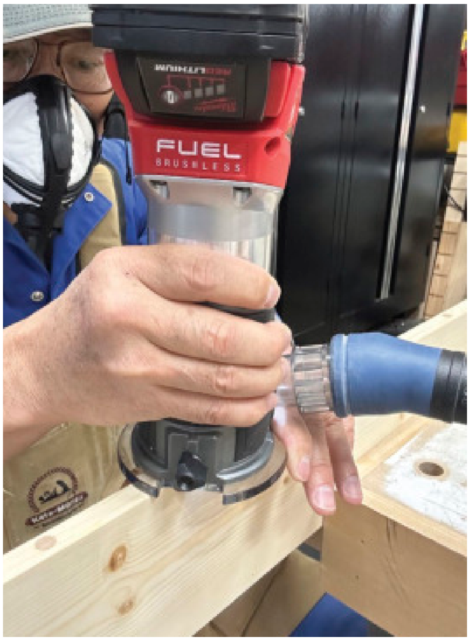
Attaching the hardware

Once the clamps are removed, the back board for the lid needs two brass hinges installed. I used a high-quality pair of hinges from Lee Valley, but this lid would function just as well with a much simpler and more cost-effective butt hinge. With the lid in place, I used a pencil to mark the location of the hinges on painter's tape so there was no chance the pencil marks would remain on the wood, as all surfaces are mostly sanded. A marking knife cut next to the edge of the hinge makes it easier to use a pull saw to cut the depth of the hinge plate. I then used a trim router with a straight bit to remove most of the waste, then cleaned it up with a chisel.

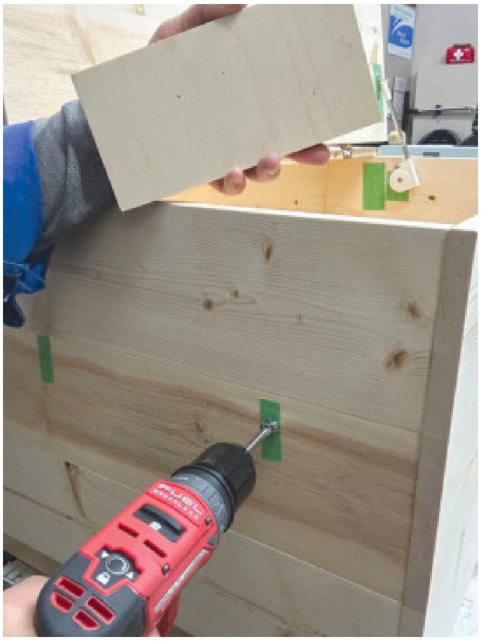
Use a downcut spiral bit in a router to remove most of the waste, then use a chisel to clean up to the saw line. Drill all hinge screw holes with a self-centring bit.



Form the Mortise Sides – Takeda uses the scored lines to help him position his hand saw, which he uses to further form the sides of the hinge mortises.



Remove the Waste – With the hinge mortise sides created, a trim router, equipped with a straight bit, will help remove the rest of the material. Clamping a piece of scrap wood on a face of the workpiece, with its edge flush with the edge of the workpiece, will give you something to help steady the router during this operation.



Rope Handle Holes – Drill two holes in each side of the assembled project to accept the ends of the rope handle. Takeda first drilled from the outer face towards the inner face, and used a scrap to help him determine when the centre spur of the drill bit was about to protrude through the inner surface. At that point, he drilled from the inside out, which eliminates blowout.

Drill 1/2" diameter holes on the sides with a Forstner bit to anchor white nylon rope for the handles. To prevent tear-out as the Forstner bit drilled through, I held a scrap board on the inside and stopped drilling when I could feel the centre point contact the scrap board. You can also stop drilling to check on your depth. I then drilled from the inside out to complete the hole.

I also used a 1/8" round over bit in the holes to ease the edges to reduce stress on the rope and to avoid splintering. To prevent the end of the rope from fraying when cutting the rope, place a piece of painter's tape snuggly on the cut line and cut through the tape. Use a small flame to melt the ends of the rope before removing the tape.

Final adjustments

I made the front and back panels slightly proud of the sides and used a combination spiral trim bit to flush up the ends to the side panels. You could also do this with a sharp hand plane or a belt sander.

It's also time to fill the four square holes in the sides with filler blocks, if you choose to take that route. Cut a length to the correct width and height, then trim the blocks to length from that strip and glue them in.

For some added visual detail, I included brass-coloured GRK low profile #8 × 1-1/2" long screws in the box corners and to secure the top lid board. I don't think the box corners need the screws for strength, but it doesn't hurt. I predrilled the holes with a drill jig to ensure I didn't angle the hole and have a screw blow out the side. A final sanding with the Festool edge sander to clean up marks left from the trim bit bearing, and a quick hand sanding with the grain to remove any clamp marks, sharp edges or scratches will prep the project for a finish.

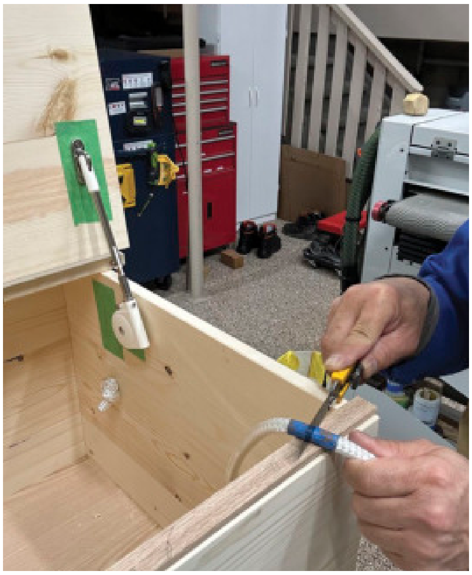
Finishing

I sprayed four coats of shellac on the inside and six coats on the outside. I prefer to mix shellac flakes in alcohol so I know the product is fresh. For this project, I mixed 1/3 dark garnet and 2/3 ultra blonde flakes in the appropriate amount of alcohol. I use a spray tent, complete with the proper filters and ventilation fan, to ensure a safe spraying environment for me and my workshop.

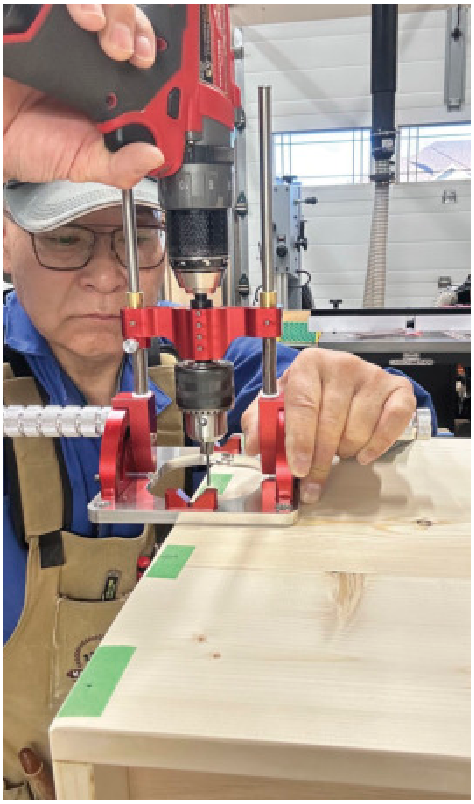
There's also nothing wrong with applying a few coats of water-based or oil-based polyurethane to this toy box, depending on what you have on hand and prefer.

Add letters

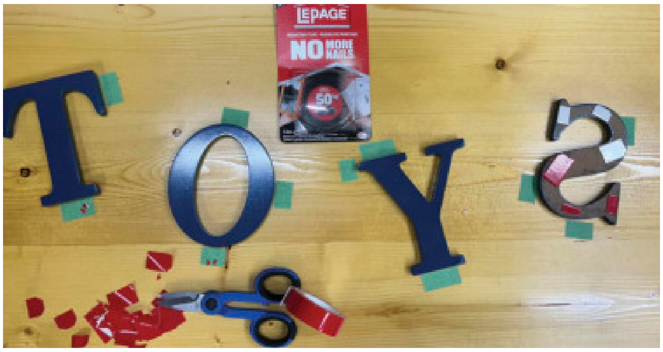
The 5" MDF letters on the box were ordered from Amazon, though there's always the option of making your own from plywood, MDF or solid wood. I sanded the letters and brushed on Target Coatings HSF5000 surface filler before re-sanding and spraying on three coats of blue enamel paint. I attached the letters to the box front



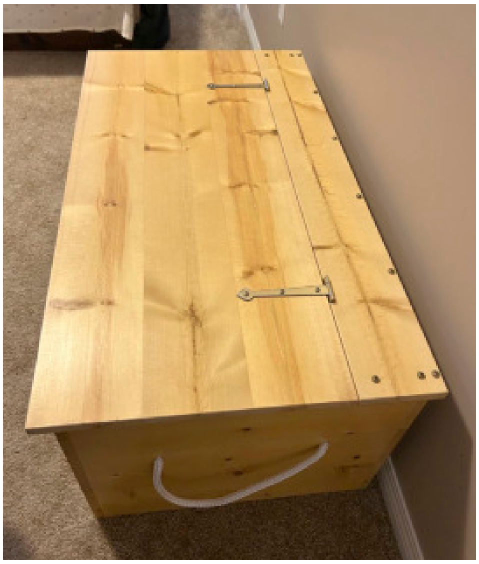
Tape, Then Cut – Takeda applies tape to the rope where it needs to be cut to length, then uses an open flame to melt the ends to keep them from fraying.



Straight Pilot Holes – If you choose to add the decorative GRK screws to the corner joints, ensure to drill a straight pilot hole so the screws don't blow out the sides of the panel or split the panel.



Add the Letters – Letters can be applied to the finished box with double-sided tape. You could also screw them on from behind or scrape off some of the finish directly behind the letters and use some adhesive.



Ready for Toys – Once the hinges have been installed, the letters have been added, the rope handles are tied in place and the GRK screws have been driven home, it's time to load the box with toys.

using LePage No More Nails double-sided tape for a permanent fix. I first arranged the letters, then used painter's tape to mark the location of each letter, then applied the double-sided tape to the back of each letter and repositioned them on the box.

When the finish had cured, I applied a coat of Renaissance paste wax to the outside of the box (after the letters were attached) with #0000 steel wool to improve the appearance and provide a bit of protection. I didn't apply wax to the inside to avoid residual odor.

I really like the natural look of the finished project without any stain or heavy colour, though everyone has their own thoughts on this. Some bold colours could fit very nicely with this toy box theme. If you're very adventurous, you could get your kids or grandkids to paint the outside of the box, though you have to be ready to say "yes" to painting it white and adding a rainbow of polka dots.

Bring this toy box upstairs and invite your kids or grandkids to start loading it up with their toys. If you can trick them into thinking that this is the most fun part, you'll never trip over another toy again.

Editor's Note: This is the first of many 2×4 projects we will be including in our pages. If you have any 2×4 projects you feel would fit nicely in a future issue, contact Rob Brown at rbrown@canadianwoodworking.com.

David is a hobby woodworker and grandfather who's employed full-time. He's made a few of these toy boxes before. The 16 days it took him to complete this specific project for *Canadian Woodworking & Home Improvement* is a record, compared to his normal work speed.

DAVID TAKEDA
david@waywoodmaker.ca
#takedadavid

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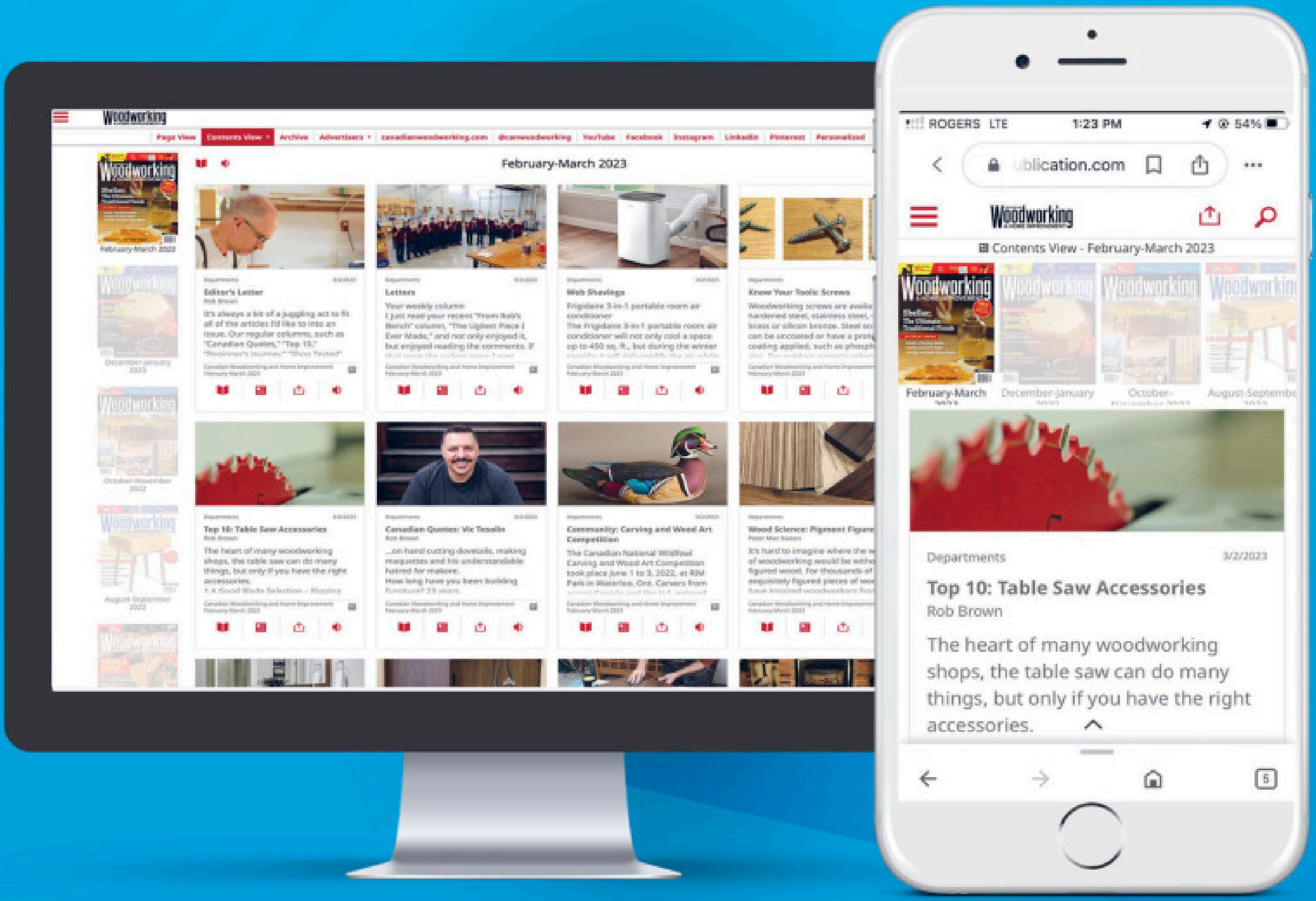
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Top 10: Table Saw Accessories

Rob Brown

The heart of many woodworking shops, the table saw can do many things, but only if you have the right accessories.

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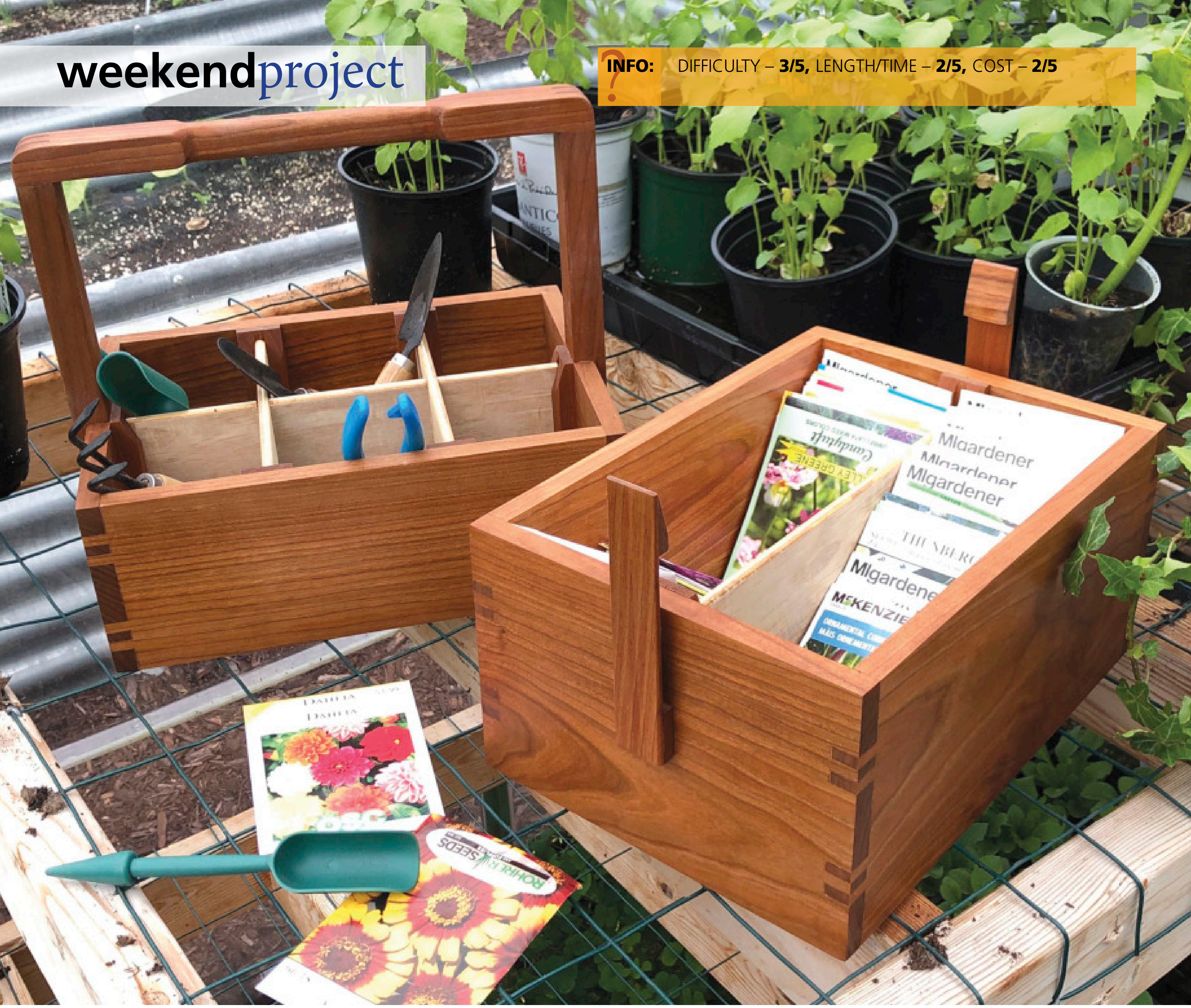


BUILD A GARDEN TOTE

Keeping all your seeds and planting tools organized and within arm's reach makes gardening even more enjoyable.

Photos by Rick Campbell Illustration by Len Churchill

BY RICK CAMPBELL

As spring approaches, my thoughts soon turn to the garden and getting my hands back in the soil. What I don't look forward to is the annual ritual of digging through the garden shed to gather all the tools and supplies needed to get the planting process underway. Well, that won't be a problem this spring because I built this handy seed-starting tote to keep everything organized and ready to go.

The partitioned tray on top has plenty of room for all my gardening hand tools and the base underneath has more than enough space to arrange my entire inventory of seed packages. A wood latch connects the tray to the base so the entire unit can be picked up by the handle and carried around. If you're not into gardening, this versatile tote could also carry hand tools and hardware when doing minor repairs around the house.

Tray and base construction

I built my tote out of cherry because I love its rich tone and beautiful grain pattern, but you can construct yours out of any species you happen to have on hand.

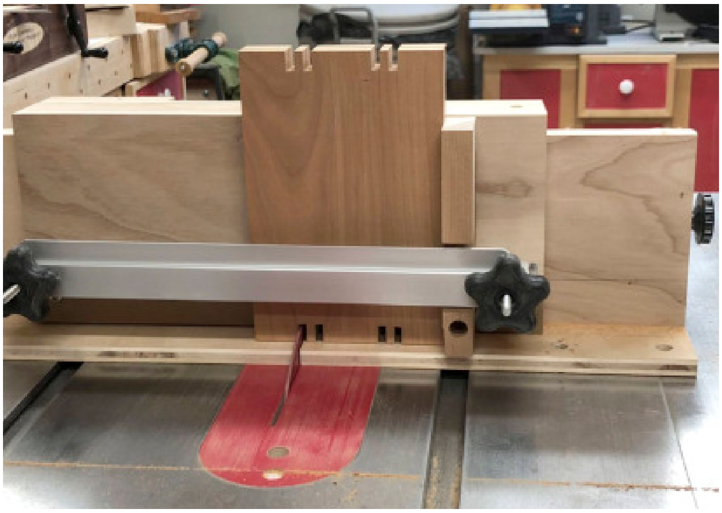
Begin by preparing enough 1/2" thick stock to make the side and end panels for the tray and base, then cut the parts to size. I used sturdy box joints to assemble the corners of my project, but many other joints will also work if you want to simplify or adjust the construction process. A box joint jig will go a long way to assisting you with making this exceptionally strong and nice-looking joint. My jig is more complex than most, though any box joint jig can help you machine these joints, as long as you set it up properly.

Regardless of the method you follow to make box joints, I have a few tips that may help to up your game. First of all, double up the side and end panels to speed up the process and always use a backer board to prevent unsightly tear-out. It's also good practice to make the slots a hair deeper than the thickness of the connecting pieces so the ends of the interlocking fingers can be sanded perfectly flush after assembly.

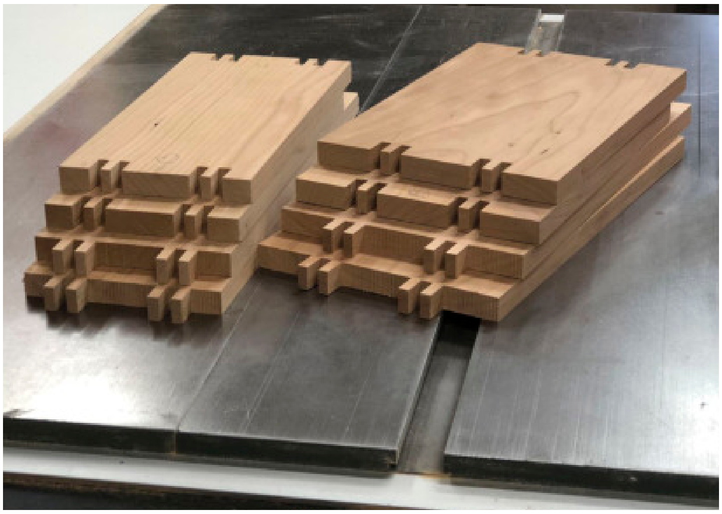
After preparing the box joints, your next task is to mill 1/4" wide by 1/4" deep slots in the interior walls of the base and tray parts to receive the bottom panels. For the long side panels, the dadoes can extend the entire length of the parts, but you need to stop 1/8" short of the edges when completing the grooves for the end panels. If you don't, the gap on the end of the dadoes will be visible when you assemble the joints.

I prepared all these dadoes using a guide fence and a 1/4" diameter straight bit installed in my router table. Don't attempt to complete the procedure in a single pass or you risk overburdening the router, scorching the bit, getting a poor cut or worse. A better strategy is to make a series of progressively deeper passes until the final 1/4" depth is achieved.

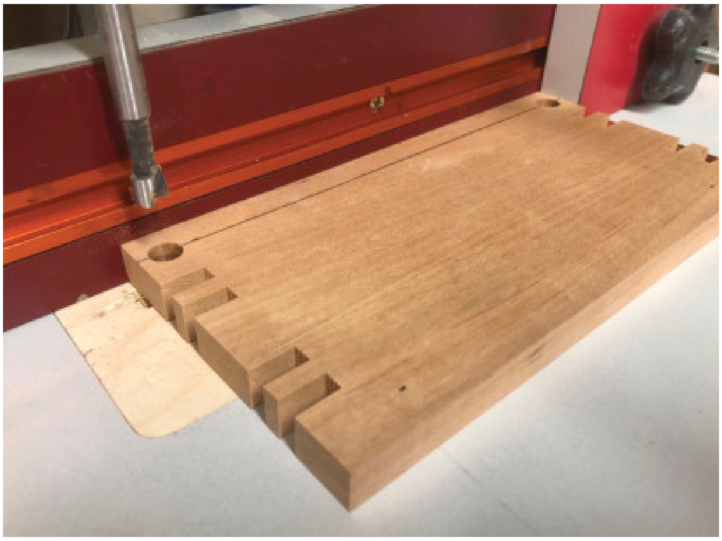
The full-length dadoes for the side panels are straightforward, but the stopped dadoes on the ends can be a bit tricky. Typically, stopped dadoes involve plunging the part over a rotating straight bit to begin the groove and lifting the piece off the bit before reaching the end. If you're using a proper plunge router bit and are knowledgeable and comfortable with this operation, great, but I've never been comfortable with the idea of pressing a piece of wood onto a



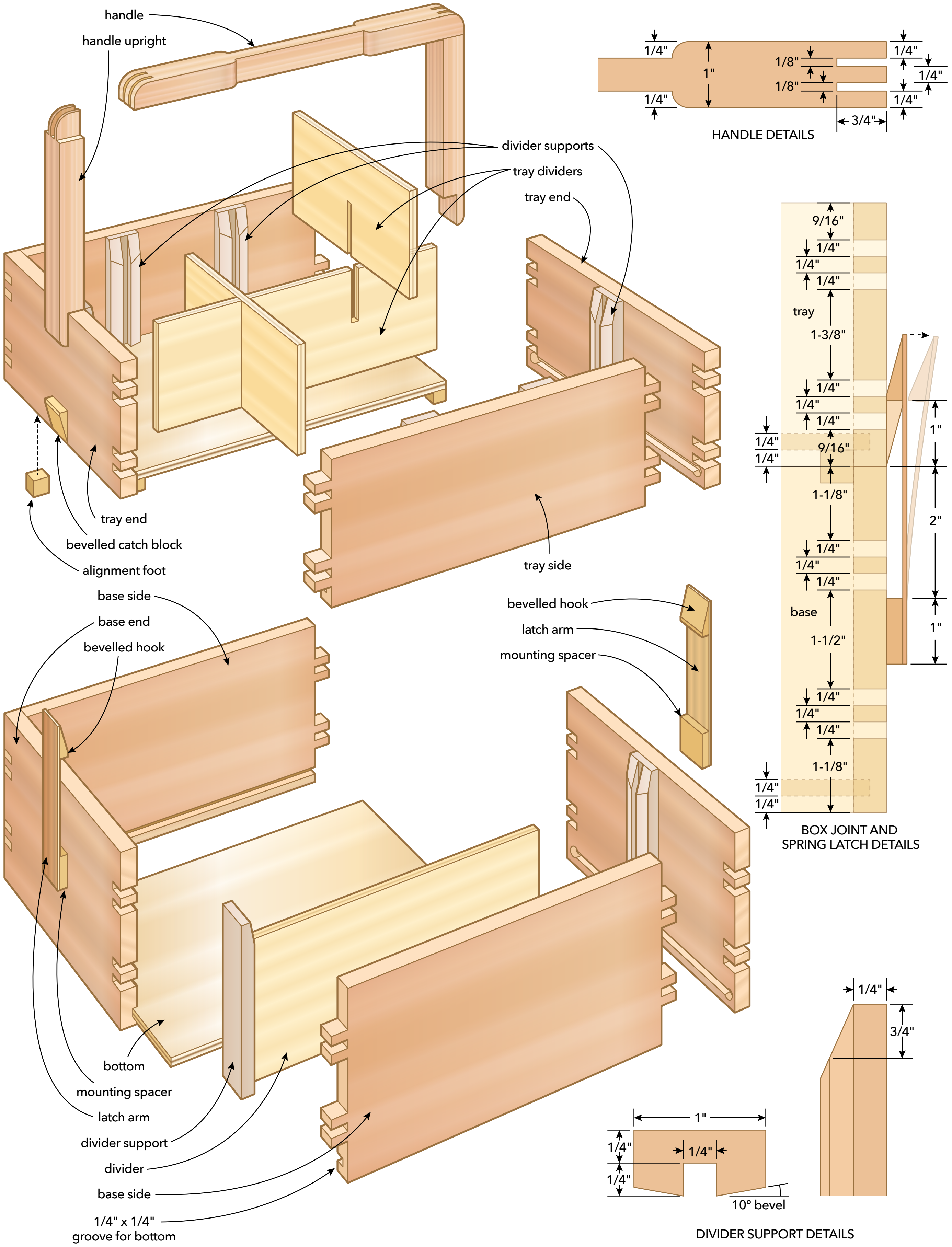
Box Joints Are an Option – Campbell machined offset box joints with a dedicated jig for his garden tote, but other joints would also work.



Nicely Cut – Here are the offset box jointed sides and ends, ready for the next step.



A Hole Lot Easier – Boring a hole into the start and end area of the bottom groove makes machining the groove a lot easier.


handle
handle upright
divider supports
tray dividers
tray end
tray end
bevelled catch block
alignment foot
tray side
base side
base end
bevelled hook
bevelled hook
latch arm
mounting spacer
bottom
mounting spacer
latch arm
divider support
divider
base side
1/4" x 1/4"
groove for bottom
1/4"
1/4"
1"
1/8"
1/8"
1/4"
1/4"
1/4"
3/4"
9/16"
1/4"
1/4"
1/4"
tray
1-3/8"
1/4"
1/4"
1/4"
1/4"
1/4"
9/16"
1-1/8"
1/4"
1/4"
1/4"
base
1-1/2"
1/4"
1/4"
1/4"
1-1/8"
1/4"
1/4"
1"
2"
1"
1/4"
3/4"
1"
1/4"
1/4"
1/4"
10° bevel

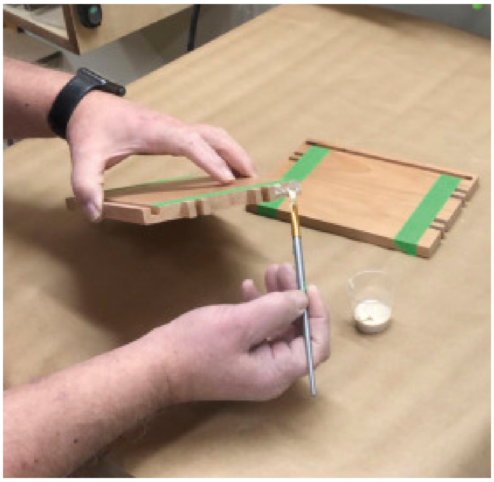
HANDLE DETAILS

BOX JOINT AND SPRING LATCH DETAILS

DIVIDER SUPPORT DETAILS

Materials List

Part	Qty	T	W	L	Material
Tray Sides	2	1/2	4	11	Black Cherry
Base Sides	2	1/2	5-1/4	11	Black Cherry
Tray Ends	2	1/2	4	8	Black Cherry
Base Ends	2	1/2	5-1/4	8	Black Cherry
Bottoms	2	1/4	7-1/2	10-1/2	Plywood
Divider Supports	6 / 2	1/2	1	3-1/2 / 4-3/4	Black Cherry
Dividers	4	1/4	3-1/4 / 4	To Fit	Plywood
Alignment Feet	4	1/2	1/2	1/2	Black Cherry
Handle	1	3/4	1	11-1/2	Black Cherry
Handle Uprights	2	3/4	1	7	Black Cherry
Latch Arm	2	1/16	1	5	Black Cherry
Bevelled Hook	2	1/4	1	1	Black Cherry
Mounting Spacer	2	1/4	1	1	Black Cherry
Bevelled Catch Block	2	1/4	1	2	Black Cherry



Keep It Clean – While Campbell applies glue to the finger joints and brings the sides and ends together, he uses masking tape along the inside of the joint to ensure a cleaner final result.

shaft of sharp spinning metal. Instead, I follow a slightly modified approach. I start by using a flat-bottomed Forstner bit with a slightly wider diameter than the width of the slot to make a 1/4" deep pocket at the beginning and end of each slot location. For this application, these holes are located 1/8" from the edge of the parts.

Next, I position the router fence and set the bit height for the initial shallow pass. When all of this is ready to go, I place the pocket I drilled on the front end of the workpiece over the bit and hold the part firmly against the fence as I turn on the router. It's best to check that the bit freely rotates with the workpiece in place before you turn the router on. With the router on, I slowly guide the part over the bit until I feel it break through the wall of the pocket on the other end. Continuing to hold the part firmly against the fence, I turn off the router and let the bit come to a complete stop before picking up the workpiece. I progressively raise the bit and repeat this process until I reach the full 1/4" depth.

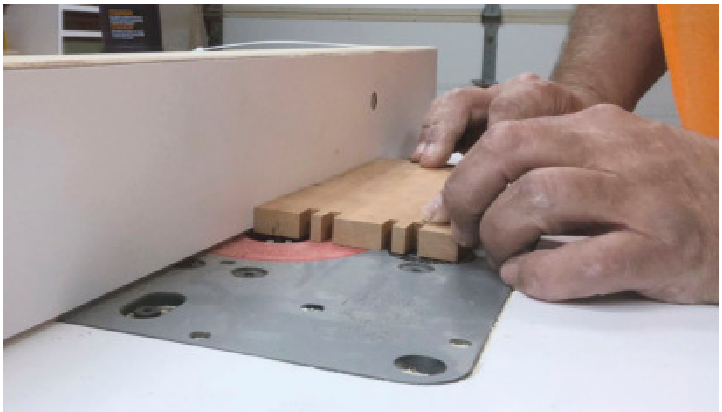
Bottom panel and dry assembly

After milling the grooves, cut the bottom panels to size. I made my bottom panels out of 1/4" plywood because it's not subject to the seasonal expansion and contraction that can be experienced with solid wood. Now that all the parts are ready to go, dry assemble the tray and base to see if everything fits according to plan. If it all checks out, take it apart and finish and the interior faces to prepare for final assembly.

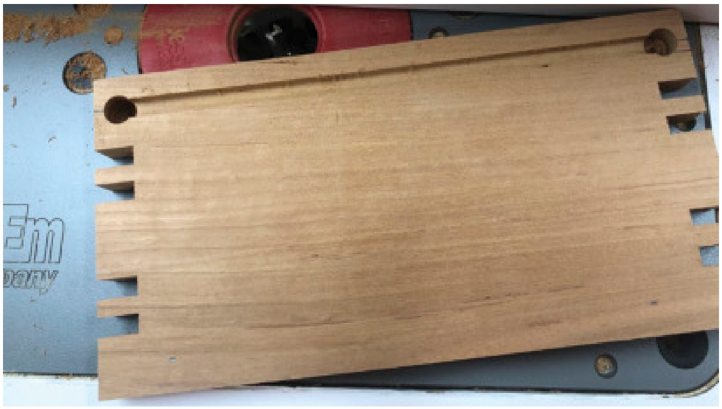
Assemble the box

Whenever I'm assembling boxes, I always take a few moments to apply strips of painter's tape to the inside edges of the joints. This small investment of time makes cleaning up any glue squeeze-out much easier after the joints are assembled. Next up is to spread glue in the joints and assemble the tray and base with the bottom panels in place. Check for square before setting the assemblies aside to dry. After the clamps are removed, sand the ends of the fingers flush at the corners.

There is one more detail to take care of before moving onto the next stage. Cut some 1/2" square cube-shaped feet to install on the underside of the tray. These feet are positioned in the corners to help align the tray

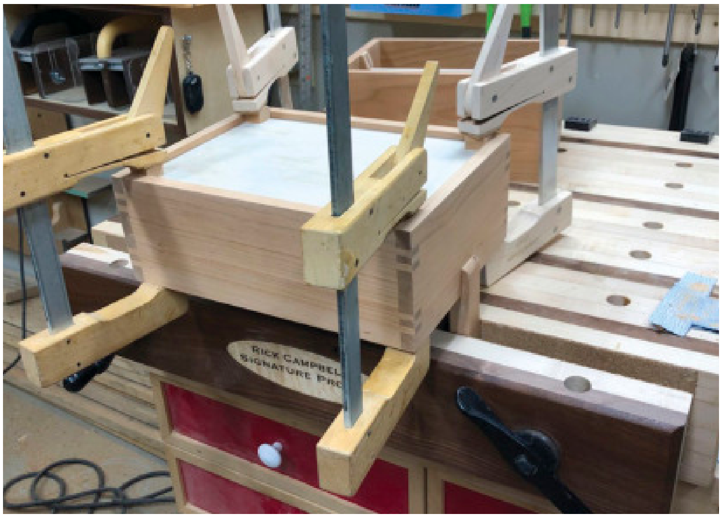


Cut the Grooves – With the holes bored, it's time for Campbell to use his router table to machine the grooves. He does this with multiple passes and progressing depths as that's safer and leaves a nicer groove.



All Done – The finished grooves are now in each of the sides and end panels.

Let It Dry – With the sides and ends together, and the sub-assembly squared up, it's time to let the glue dry.



Alignment Feet – Although these four feet are what the upper tray will stand on when it's lifted off the base, the main purpose of these feet is to keep the upper tray centred over the base when they're together.

More Fingers – Again, different joints could be used to fasten the handle to the uprights, but Campbell liked the look and strength of finger joints.

Better Grip – A notch is cut into the two sides of the handle to offer a better grip. Sand these two surfaces after they're cut on the bandsaw.

with the base when the tray is stacked on top. Use a sanding block to slightly ease the exposed edges of the feet before gluing and clamping the blocks in place.

Can you handle this?

The next step is to make the carrying handle for the tray. The handle assembly is comprised of two uprights connected to a horizontal handle. The parts connect with each other with finger joints. The bottom ends of the supports are rabbeted to make the connection with the tray.

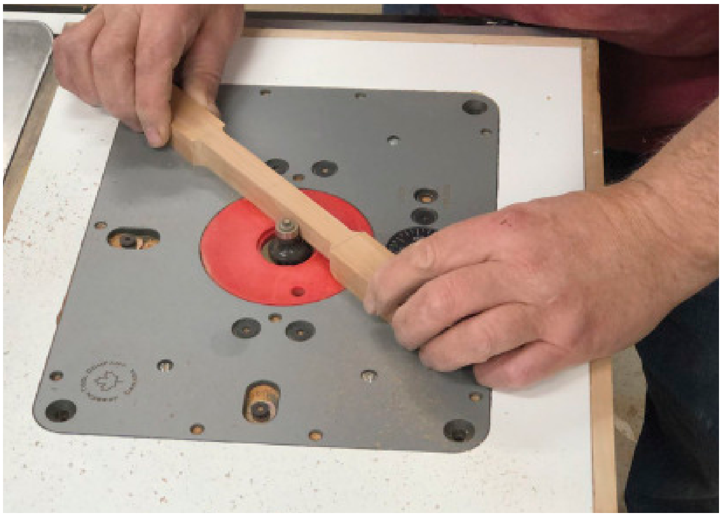
Begin by cutting the uprights and handle to size from 3/4" thick material. Next, dust off your trusty box joint jig to prepare the joints that will connect the corners of the handle assembly. I used my box joint jig to machine these joints, but even a simple half-lap joint will also keep the handle-to-upright joints together for a long time.

The centre section of the handle is recessed to create a more comfortable grip. It's easier to complete this recess before attaching the handle to the uprights. Lay out the shape of these indentations, then head over to the bandsaw to make the cuts. After sanding to remove the saw marks, install a 1/4" round over bit in your router table to ease the edges.

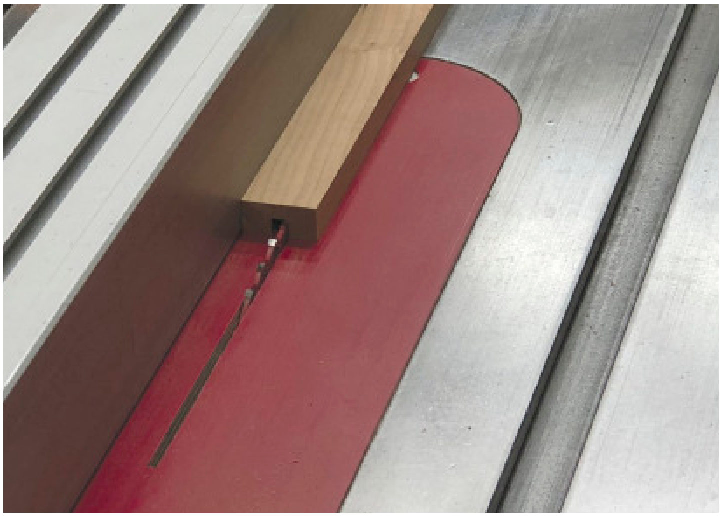
Mill a 1/2" deep by 1" long rabbet on the end of the uprights to anchor the parts to the tray. I was too lazy to switch over to a dado blade, so I just nibbled the material away by making multiple passes over a standard saw blade.

When all this work is complete, you're ready to assemble the handle and uprights. Make sure the corners are square before setting the assembly aside to dry. It's also a good idea to make sure the assembly will fit over the tray before it cures. You could even clamp the handle assembly to the tray while it's drying, just to make sure it will fit.

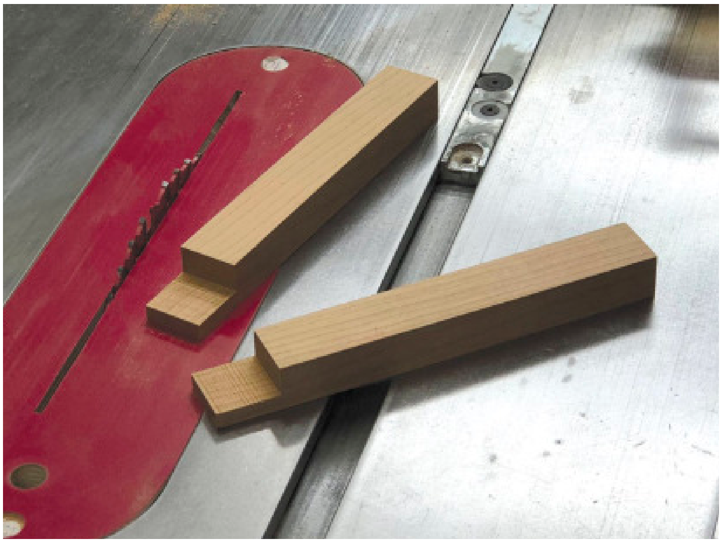
After the glue has set, lay out the decorative 1/2"-radius curve on the top corners of the handle assembly and a 1/4"-radius curve on the bottom ends of the uprights. Make the cuts on the bandsaw, then sand the rough surfaces smooth. While you have the sandpaper in hand, you may as well use it to soften the remaining



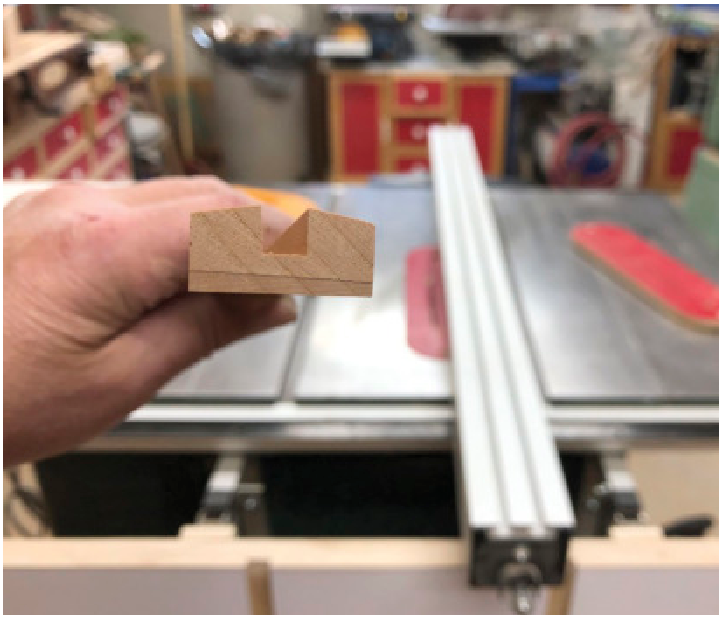
Round It Over – A small round over bit installed in a router table will further ease the handle.



Centred Grooves – Campbell machined the first 1/8" groove slightly off-centre in the face of the grooved supports, then end-for-ended the workpiece and ran another groove. This left him with a 1/4" wide groove centred on the supports.



Nice Notches – Notches in the ends of the two uprights will allow the handle assembly to fit against the outer surfaces of the end panels and be glued in place.



Bevel the Face – With the table saw blade set at an angle, Campbell machined a bevel into the two sides of the outer face of the grooved supports. This was mainly for the nice visual it created.

crisp edges on the handle assembly. When you're done, install the handle assembly on the tray with glue and a spring clamp, securing each joint.

Divide and conquer

Prepare the partitions that divide the tray for tool storage and the base for seed packages. The partitions slide into grooved supports that are glued to the interior walls of the boxes. Start with the supports by ripping enough 1" wide strips from 1/2" thick material to yield all these parts. Next, mill a 1/4" wide by 1/4" deep groove down the centre of each blank. I did this at the table saw by making two passes with a standard 1/8" kerf saw blade. I set the saw fence 3/8" from the blade and completed the first pass. Then I rotated the blanks 180° before making the second pass. This technique will ensure the grooves end up being perfectly centred across the width of the material.

A decorative bevel is applied to the sides of the supports. I completed this detail by running the blanks on edge over a saw blade tilted 10°. Position your fence so the top of each bevel just kisses the edge of the slot. Run the blank on edge over the blade to complete the bevel on one side, then flip the workpiece end-for-end to do the same for the opposing edge. For safety, push sticks are a good idea to keep fingers well clear of the spinning blade when executing this procedure.

After profiling the sides of the blanks, cut the parts to final length and apply a matching bevel to the top end of each support. I used a stationary sander to form these tapers by eye, because it was much safer than trying to pass the parts on end over the table saw blade.

Now you're ready to install the supports in the tray and base. Spread glue on the back and use scrap spacer blocks to prevent the parts from slipping around while you apply clamps.

Ready for Glue – With the groove supports cut to length, then bevelled on their ends with a sander, they're ready to be installed in the main box.

Interior dividers

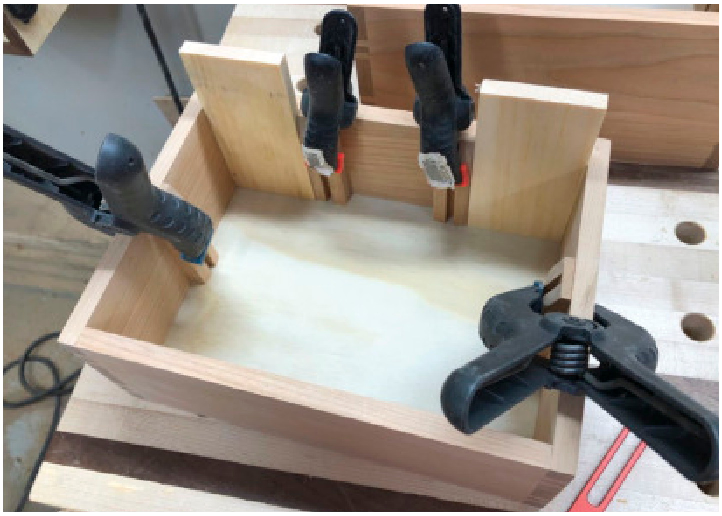
I made the interior dividers from 1/4" plywood, but you can use solid wood if you prefer. Cut all these parts to size. The partitions for the tool tray are notched where the dividers intersect. For accuracy, it's best to mark the locations of the notches with the dividers in position. To do this, slide the long centre divider into the support slots, then hold the shorter dividers in place on top to mark where the two parts meet. Take the dividers to the table saw and use the mitre gauge to cut slots halfway through the width of the material, using your pencil lines as your guide. This is another instance where a backer board is a good idea to prevent tear-out.

With this work done, slide the dividers into place and step back to see how you did. No glue is necessary here.

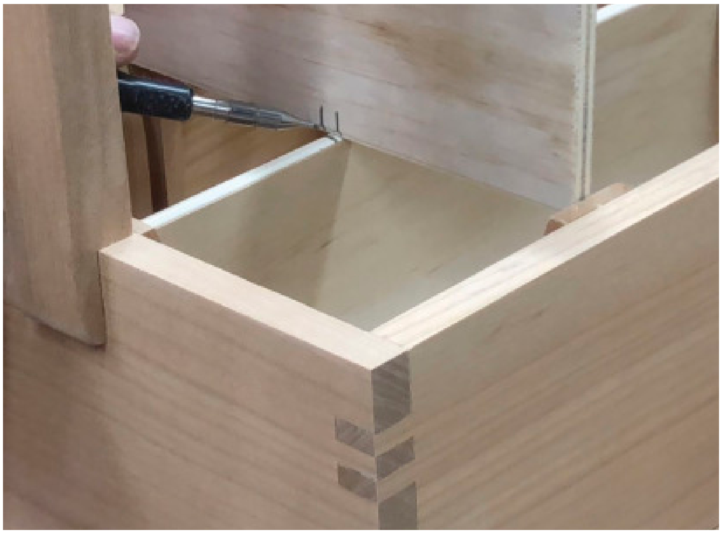
There's a catch

You may have noticed that so far, no mechanical fasteners have been used to assemble this project. To keep that theme going, I decided to make an all-wood latching system to connect the top tray to the base. Each latch assembly consists of a thin latch arm with a slight hook on the top end and a spacer block on the bottom. One of these assemblies is secured on each end of the base. When the tray is placed on top of the base, the thin strips flex out of the way to allow the hooked ends to engage with catch blocks mounted on the ends of the tray. The hooked ends and catch blocks are bevelled to guide the parts into place when the tray is snapped into position on top. This is a clever design, if I do say so myself.

Start by ripping a thin 1/16" thick strip from the face of a 1" thick blank. This slice needs to be long enough to yield both latch arms. When completing this procedure, be sure to use a zero-clearance insert to prevent the material from slipping into the gap between the insert and the blade. It's also essential that you position the fence so the thin strip falls free to the outside of the blade. Otherwise you run the risk of getting the material wedged between the blade and fence, which could lead to dangerous kickback. For this type of work in my shop, I built a thin strip ripping



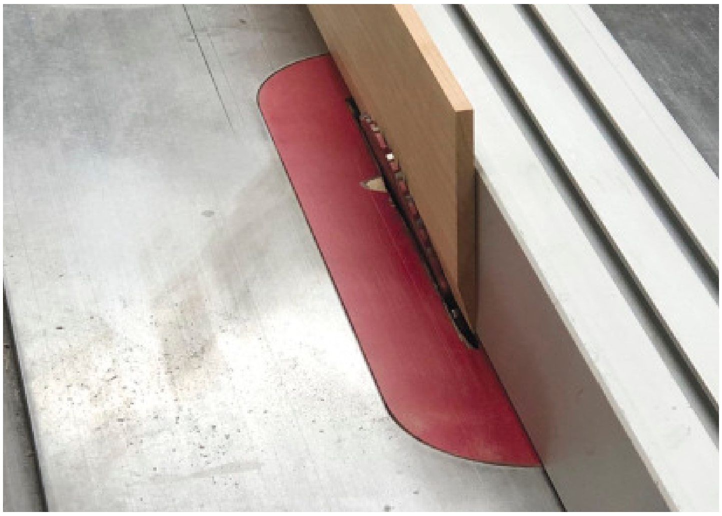
Scraps to the Rescue – Scraps cut to the correct width will help you keep the supports square and equidistant from the end panels while you glue them up.



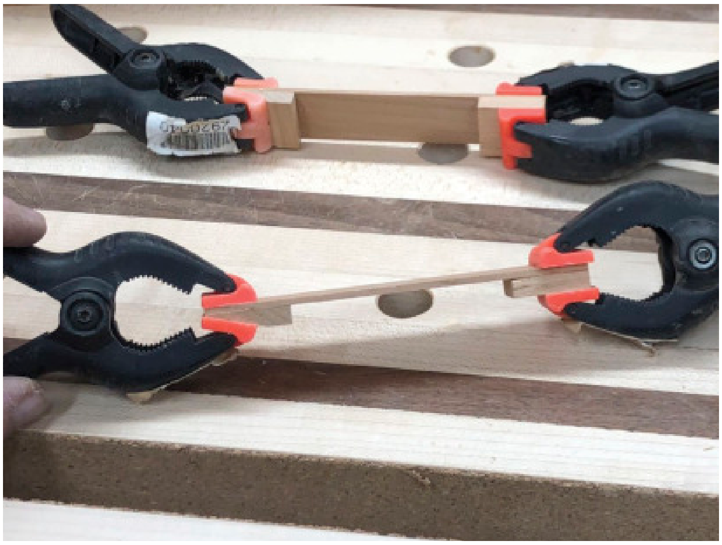
Locate and Cut – With the main long divider in place, Campbell positions the short dividers above and marks where notches need to be cut into the short dividers.

SCREWDRIVE

Test the Fit – Once the notches have been cut you can assemble the dividers in the box. Glue isn't needed to keep them in place.



Bevelled Cleats – The latches that keep the tray fixed to the base work smoothly because of bevelled hooks and a flexible latch arm. Campbell rips the bevel into an oversized workpiece before ripping the bevelled edge off and cutting it to length to make each bevelled hook.



Light Pressure – Spring clamps will provide enough pressure to bring the bevelled hook and latch arm together.

jig to get the job done safely. Once you have the thin slice of material in hand, cut the two latch arms to their finished length.

Next, turn your attention to the latch hooks, spacers and catch blocks. Start by preparing some 1/4" material to make all these parts. It's safer to bevel the edge of a wide blank before cutting out the tiny hooks and catch blocks to size. This is done by running the blank on edge over a saw blade tilted 15°. Use a zero-clearance insert and position the fence about 1/16" from the blade to complete this procedure.

After bevelling the edge, return the blade to 90° and rip a 1" wide strip for the hooks and catch blocks. Using the same setup, rip a second strip with square edges on both sides to make the spacer blocks. Now you can crosscut all these parts to length.

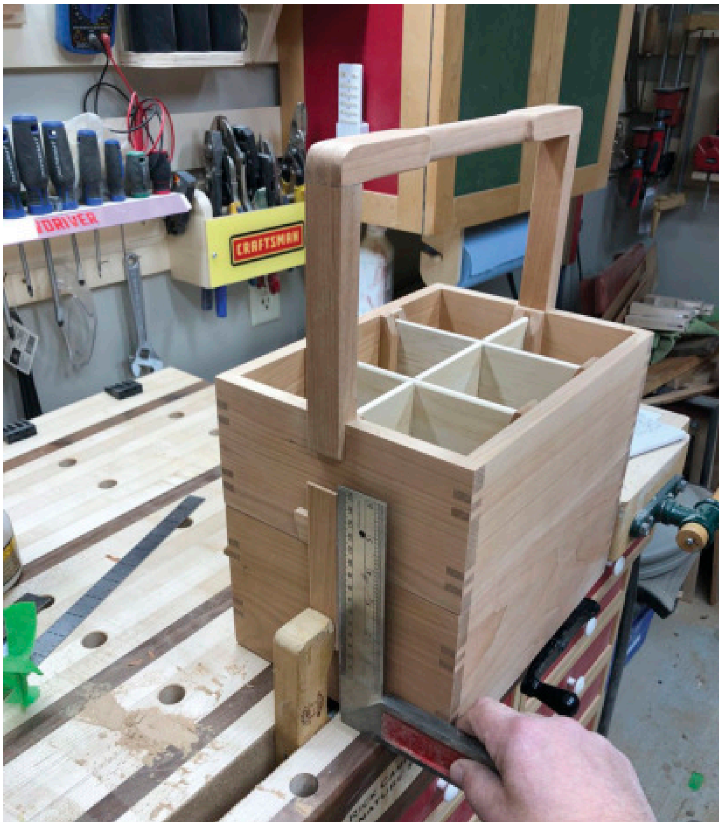
Apply a dab of glue to the back of the spacers and hooks, then use spring clamps to secure them to the ends of the latch arms. Make sure the bevel on the hooked end is oriented in the correct direction before leaving the assembly to dry. I learned this lesson the hard way. You can also apply glue to the back of the latch supports and install these parts centred on the ends of the tray.

After all this is dry, get out the glue bottle one more time to fasten the latch assemblies to the base. To get the positioning just right, start with the tray in place on top of the base. Now rest the hooks in position on the supports and clamp the spacers to the base using a single clamp stretching from one end to the other. Let the glue cure overnight before attempting to flex the latches clear of the supports to release the tray for the first time.

The finish line

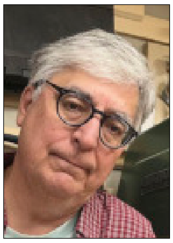
Now that your handsome tote is fully assembled, go ahead and break out the sandpaper to prepare the project for the finish of your choice. I went with tung oil for my tote because I like how it enhances the cherry grain and it's foolproof to apply.

After the finish dries, there's nothing standing in the way of organizing all that seed-starting paraphernalia you managed to dig out of the backyard shed. Just be comforted by the fact that this is the last spring this annual scavenger hunt will be necessary.



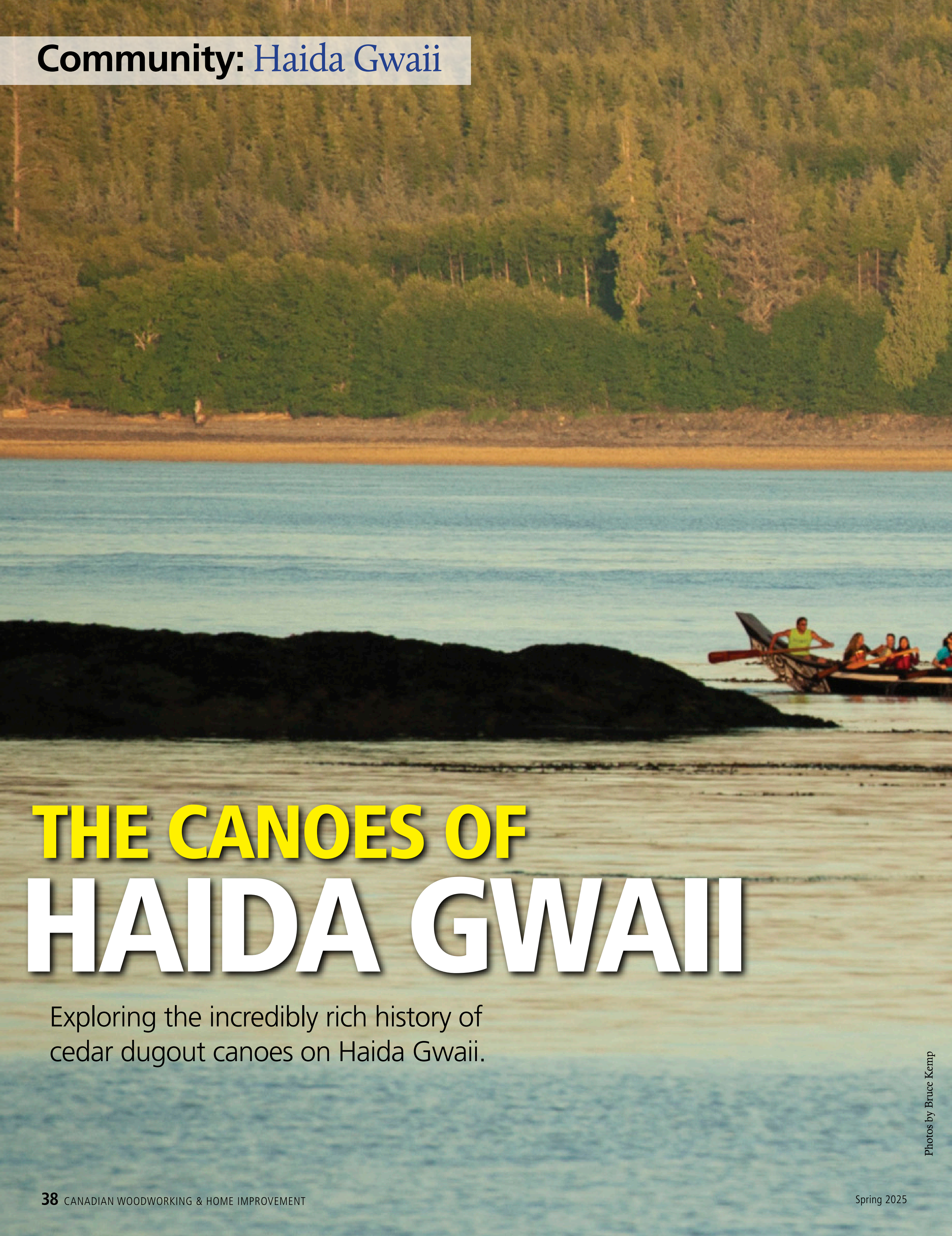
Square It Up – Ensure the latch arm assembly is perpendicular to the base when you glue and clamp it in place.

Besides being an obvious dead ringer for Brad Pitt, Rick has written well over a hundred project articles for various North American woodworking publications and enjoys taking every opportunity to make sawdust in his London, Ontario, workshop.



RICK CAMPBELL
finrtc@gmail.com

Community: Haida Gwaii



THE CANOES OF HAIDA GWAII

Exploring the incredibly rich history of cedar dugout canoes on Haida Gwaii.

Photos by Bruce Kemp

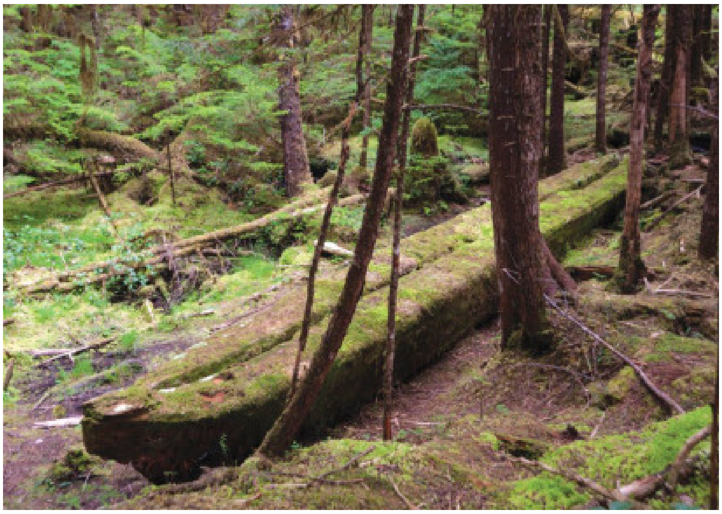
BY BRUCE KEMP

Haida Gwaii was always a mystical place for me, almost like Camelot, and I'd always wanted to visit. The Haida people, in particular, were just as fascinating as the islands themselves because they were sea people and I felt a definite kinship with them. When the opportunity came for my wife and I to visit the archipelago off BC's coast, I embraced the opportunity. The icing on the cake was the discovery, once we'd arrived, that some of the old canoes could still be found and the legendary canoe carvers were still practicing their art.

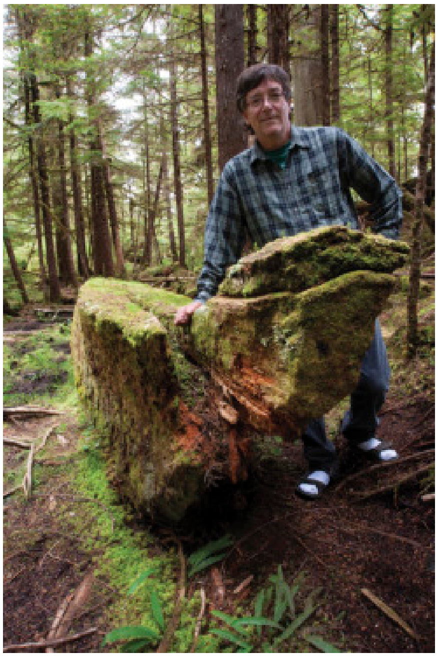
Making our way through old-growth forest on Haida Gwaii, the archipelago off the B.C. mainland known until recent years as the Queen Charlotte Islands, I found traces of ancient Haida artisans. I could see where strips of cedar bark had been cut away for use in weaving mats and clothing, but I'd hoped to find one of the partly completed dugout canoes abandoned in the forest long ago by their builders, and these eluded me. Such canoes—no one knows how many—slumbered in the forests for as long as 150 years before anyone other than loggers paid attention to them. An earlier generation named one road the Canoe Main for the large number of abandoned boats hauled out of the bush to be re-sawn into lumber.

My disappointment showed later in conversation with Bridget Quinn, curator at the Port Clements Logging Museum. She told me her neighbour, Dale Lore, had found a partly completed canoe in the dense forest and loved to show it off. Before I could ask directions, she had him on the phone. Lore not only came to meet me but also drove me out into the forest, turning into a tunnel of scrub alder not far from where I'd been hiking earlier. Soon, he came to a stop. "You go first," he said. "You should see this by yourself."

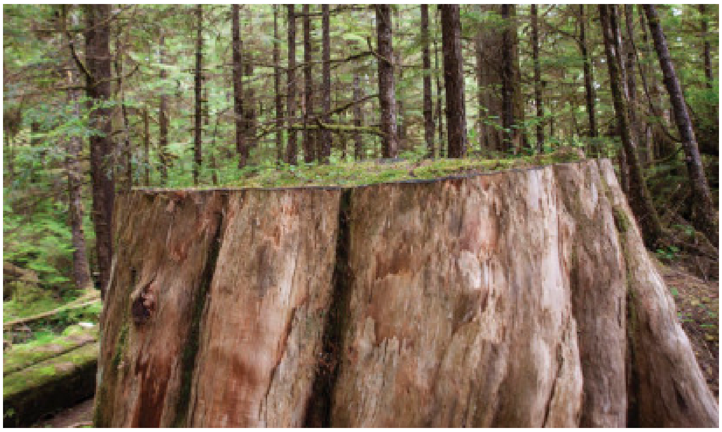
Walking into the thick forest, I first saw a giant cedar stump, its moss covering proved the tree hadn't been felled recently. To my



Dormant Giants – You could be forgiven for not recognizing this as a canoe under construction after it has rested for nearly 150 years on the forest floor. It's only one of dozens – maybe hundreds – abandoned during the smallpox devastation.



Like Finding Gold – Dale Lore found this abandoned canoe in the back-country while surveying. Estimates suggest it was carved around 1860-70 and was abandoned because the carvers who felled the tree succumbed to smallpox before they could finish. Canoes like this were attempts to develop family wealth, but when small pox struck the carvers, they simply put their tools down and returned to their villages to die.



Giant Stump – The stump of a monumental cedar felled by gouging and fire. You can see the rim of burnt wood just along the flattened edge of the giant stump.

left was a standing cedar with a metre-wide hole about head high, evidence of a canoe carver checking for a suitable tree.

Then, I turned and saw the form of a canoe lying at the bottom of a streambed. It looked like any other log, but unnaturally flat along the top. On closer inspection, the shaped bow and stern became clear, along with the curve of the sheer. The hull was upright, ready to be hollowed out. I guessed its length to be roughly 12 metres, with a beam of perhaps one metre and a depth of a little less than a metre.

Trapped beneath the hull were remnants of small trees placed to cushion the fall of the canoe-tree, whose cut-off top lay beyond the stern.

Lore, a non-native who has lived in the islands since 1987, found the canoe in 1995 while building a logging road. Since then, he's had plenty of time to analyze it. "The guys building it had iron tools, not steel," he told me when he caught up with us in the grove. "You can tell from the tool marks on the stump. They chopped, then burnt, which you still needed to do with iron tools, but not with steel."

The traditional technique was to use controlled fires to do much of the heavy work of felling such a tree.

"The Haida got iron from Russian fur traders, and it wasn't until years later that they had steel," Lore said. He believes the canoe is at least 130 years old. "The key to the age comes from the top of the tree," he said, as I followed him to the tree's moldering upper section. It had become a nursery tree, with five new cedars growing out of its fallen trunk. "It takes at least a hundred years for that to happen," Lore said.

"Cedars are slow-growing, and those new trees are at least 30 years old, so that puts this site somewhere around 1880—right when the smallpox epidemic was killing everyone." In the late 18th and 19th centuries, smallpox epidemics swept through the island villages. Carvers simply laid down their tools and went home to die.

"We think this canoe was being made by one of the poorer clans. It's nine miles [14.5 kilometres] to the [Masset] Inlet, and the richer Haida had clan forests a lot closer. So, these guys weren't very wealthy and came all the way out here to get their tree." In the wake of the epidemics, canoe building among the Haida all but disappeared for 80 years.

Forests here have a tangible silence. Even though the carpet of needles on the forest floor was so soft I sank into it, I could still hear the hollow sound of a footfall or the rustling feathers of a raven in flight. Standing in that forest, I knew that this was one of those places where you feel the past as if it were a ghost in your attic.

Other construction methods

Lore's was not our only warm welcome in Haida Gwaii. I'd made advance contact with native Haida canoe carver John Bennett, and just after our arrival in the islands Bennett called with an invitation to a traditional Haida feast at his home. A public works supervisor in Old Massett, Bennett builds European-style plank-on-frame boats and carves canoes in his spare time.

Deadly European diseases were one factor in the extinction of canoes, but another was the influence of plank-on-frame construction, a skill at which Haida craftsmen quickly became adept. Marine engines dealt another blow. The Haida turned away from their own boat-building traditions to become commercial shipwrights for the region's growing herring fleets.

The powerful stylistic elements and sculptural perfection achieved by traditional Haida craftsmen had earned widespread respect from Europeans since their first contact in the 1700s. In the 1960s and '70s, however, fresh appreciation for traditional Indigenous art emerged worldwide, and the Haida legacy gained new adherents. Native peoples everywhere were working to re-establish their cultural identity, critical skills, and languages they had been forced to relinquish. Among the Haida, an upwelling of traditional culture took place in those days, and associated with that movement came a desire to revive the art of traditional canoe-building.

Throughout history, until modern times, dugout canoes proliferated all along the temperate rainforest coast from Alaska to northern California. They were the state-of-the-art transportation on the coast, where mountains, enormous trees, thick forests and dense undergrowth discouraged land travel. Each tribe had its own canoe tradition, but the Haida type was considered the highest form of the art. The boats were used for fishing, trade and warfare. The largest could seat 60 paddlers, and when English Captain George Dixon sailed into Cloak Bay in 1791 to trade for furs, he was greeted by 11 such boats carrying nearly 600 paddlers. Oral history has such canoes travelling as far as Hawaii and Japan, and there is archaeological evidence they did venture as far south as Baja, California.

Lost knowledge?

Haida artisans of the early modern era, however, were chagrined to find that by their time, no one knew the techniques used by earlier canoe carvers. So, they began piecing together memories from their elders and reinventing the craft by experimentation and close examination of the remaining boats.

At the forefront of the renaissance was Bill Reid, a Haida multidisciplinary artist, whose design was used on the modern Canadian $20 bill and whose most important public sculpture, the canoe-inspired "Spirit of Haida Gwaii," has long been displayed at the Canadian embassy in Washington, D.C.

Reid learned Haida culture from his grandfather, who in turn learned from Charles Edenshaw, whose work was famous internationally in the early 20th century. Edenshaw had produced a number of commissions for the American Museum of Natural History and other institutions worldwide, and he decorated the two remaining 19th-century war canoes – a 22-metre war canoe currently in the American Museum of Natural History's collection and a 29-metre war canoe housed at the Canadian Museum of History just outside Ottawa.

Reid came from a boat-building family, and when he was offered a commission to build a Haida war canoe for Expo 86 in Vancouver, he jumped at the chance. Reid was already getting on in years by the time of the world's fair, so he was only able to develop the design and oversee the canoe's construction by younger carvers and a growing school of apprentices – a pattern he established with his artwork as well. The canoe—named LOOTAS, which means "wave eater"—became an ambassador travelling widely, and even paddling the Seine into Paris. Several years ago, LOOTAS underwent restoration at the Haida Heritage Centre in Skidegate.

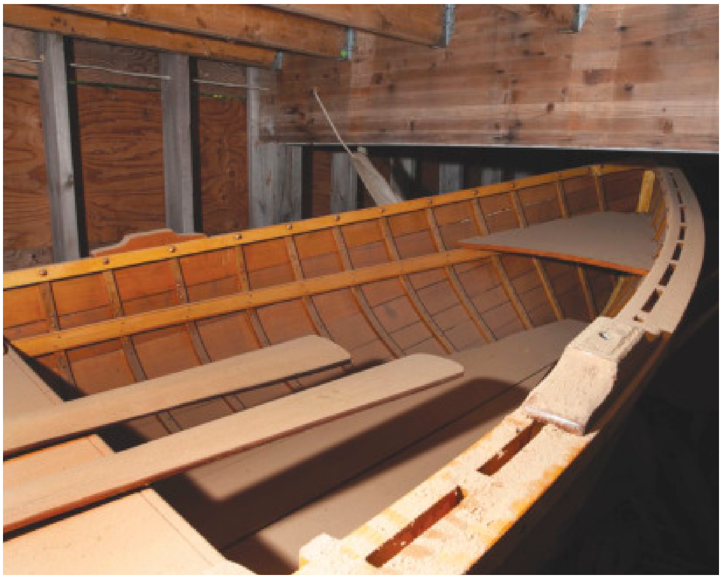
Reid eventually came to consider the canoe his most important work of art. The young carvers he tutored have grown older and, building on what they learned, are passing that knowledge along.

Hollow It Out – John Bennett uses his shop-made adze to remove large sections of waste wood from the interior of the 13' canoe he's carving. The adze lets him take heavier swings than his inshave and he can control it better than an axe, allowing him to hollow out the canoe quickly.

Water Helps – Keeping the cedar log wet prevents checking as John Bennett finishes chunking out the interior with an in-shave after removing the majority of the waste wood with his adzes.

John Bennett is one of those carrying on the tradition of canoe building in Haida Gwaii. When I visited him, he had station moulds set up for a double-ended, five-metre skiff, replicating a boat that had been built by his grandfather. The earlier boat, which was hanging in the boat shed, was in turn based on canoes built by their ancestors. But it is the dugout canoe that has become Bennett's passion. Bennett didn't work with Reid. Instead, he learned his skills from his father, Wilfred, and his grandfather – both respected craftsmen on Haida Gwaii.

His latest canoe is a small one, around seven metres overall. My visit found the boat nearly ready for the interior shaping. The



Different Styles – Haida craftsmen were also adept at building in the European style. John Bennett's grandfather built this rowing skiff based on European designs and techniques he had seen. John maintains the skiff in seagoing condition as both a practical boat and a testament to his grandfather's skill.

canoe's sides were stoutly supported on a balk of wood left in place to keep it stiff and to prevent cracking under the tremendous blows the hull has to take while chopping and adzing. The upright hull also had about four centimetres of water in the bottom to keep it from drying out.

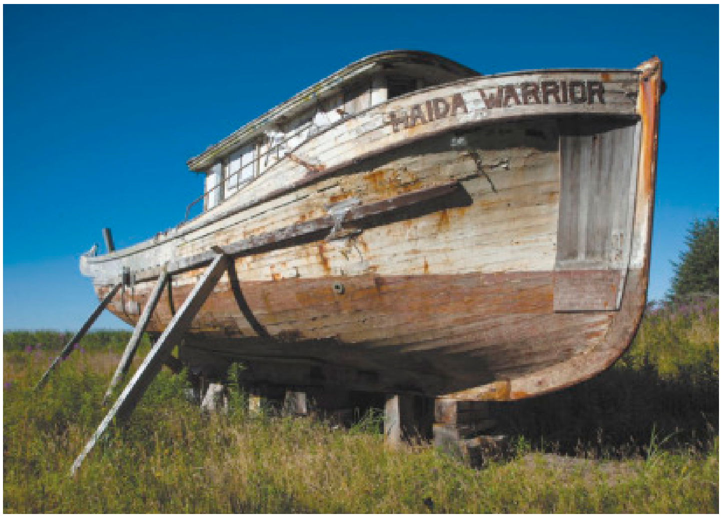
Bennett uses an adze to rough out the interior and an inshave to smooth it further. Another canoe, a 4.5-metre effort that Bennett described as "a toy," was nearby, fully completed. Behind the shed, a raw red cedar log as wide as Bennett is tall was set aside for a much larger canoe, perhaps a 40-footer.

HAIDA WARRIOR

I met another Haida carver in the islands, Christian White, with ambitions to become a canoe builder as well. In his carving shed, he stores boats built by his father, Morris. Two of them were completed in the 1980s and another left unfinished when he died. Before he would even show me these boats, however, he talked extensively about Morris and his grandfather, and insisted on showing me the herring seiner, HAIDA WARRIOR, now propped up in a field, drying out. His grandfather lost her to the fishing company that financed the boat in the 1950s. The loss is still a cause of bitterness for White. Lineage is of vital importance to the Haida culture, and White often referred to his father as he showed me work in progress in the longhouse, which is part boathouse, part carving shed.

He had a totem pole ready to carve, with the figures outlined on the surface, but the first cuts were not yet made. His father's boats occupied the shed's main space. White himself had a canoe project in mind, but he needed approval to harvest an old-growth tree.

Talking with John Bennett and Christian White, it's evident that a Haida canoe is a work of art as well of technology. The canoes are beautifully made, but they're also dependable and extremely seaworthy. They had to be: Haida Gwaii is said to be the windiest location in Canada, where wave heights often hit 12 metres.



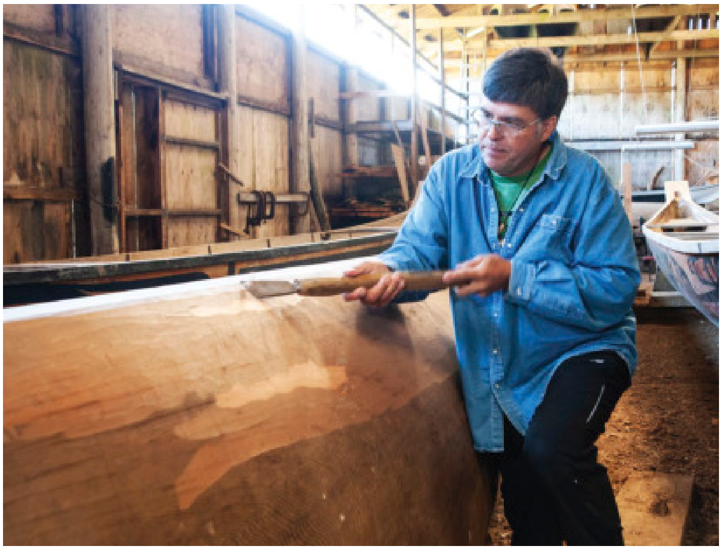
HAIDA WARRIOR – Haida boat builders were renowned for their ability to build both large and small vessels. The HAIDA WARRIOR, a seine-net fishing boat, was built by Christian White's grandfather and uncles and operated until the fishery collapsed. It now sits in a field in Old Massett awaiting restoration.

Ready to Move – Carver Christian White prepares to lift a canoe in his workshop at Old Massett on Haida Gwaii. Canoes are carved out of single logs and, despite being hollowed out, are extremely heavy.

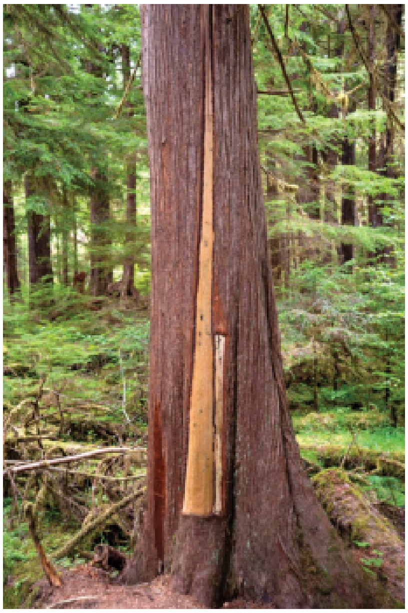
The Haida Heritage Centre

My education in the archipelago's canoes began at the Haida Heritage Centre, which has two traditional canoes and one made of fibreglass, which the locals smugly call LOOFLEX.

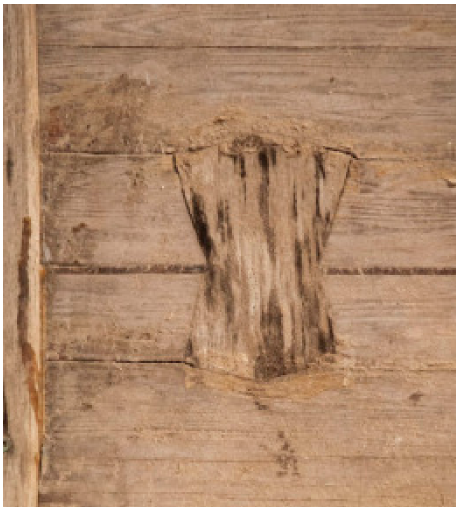
The two wooden canoes are modern renditions built by apprentice carvers at the Heritage Centre, and very sophisticated in their construction. Each is carved from a single western red cedar log. The only joinery involved comes with fitting a long extension to the bow, where harpoons would be placed, ready for use, and another cap at the stern. Both are fastened with treenails. The canoes are reinforced with yellow cedar frames which help prevent splits and provide support for the thwarts. Splits are repaired using precisely fitted butterfly tenons. White, for example, repairs his father's canoe using tenons with the same profile as copper amulets traditionally prized by hereditary chiefs.



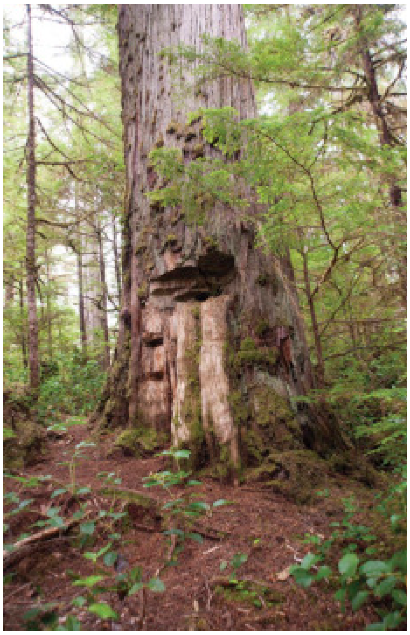
Tools Are Important – Christian White uses a shop-made, long-handled chisel to refine the hull shape of a canoe he's working on. Haida carvers are consummate craftsmen, designing and building their own, task-specific tools rather than relying on store-bought, manufactured equipment.



Valuable Material – Visitors walking in the forests of Haida Gwaii often come across trees with the bark stripped from them. In the pre-European era, the Haida developed a sophisticated technique, centred around the monumental cedar. Everything, from clothing to boats to steam-bent storage boxes, was made from these trees. This tree had its bark harvested in such a way as to not harm it and the bark most likely became the material for the famous Haida woven hats.



Beauty and Function – A butterfly-shaped Dutchman inserted into the hull of a canoe where splits have occurred. The insert is shaped like the copper sheets that were used as a form of wealth and power by the Haida. These coppers were given as gifts at potlatches and still hold an esteemed place in the culture.



Test Cuts – Cutting down a monumental cedar wasn't easy. The right tree, with no rot in its core, had to be selected. This was done, in part, by making a cut into the tree. Then the carvers began scoring the tree – first with sharpened stone tools and eventually metal tools after the arrival of the Europeans. They coated the cuts with clay to control the burning process and built fires to char the wood so it could be easily chopped out. They repeated the process until the tree fell.

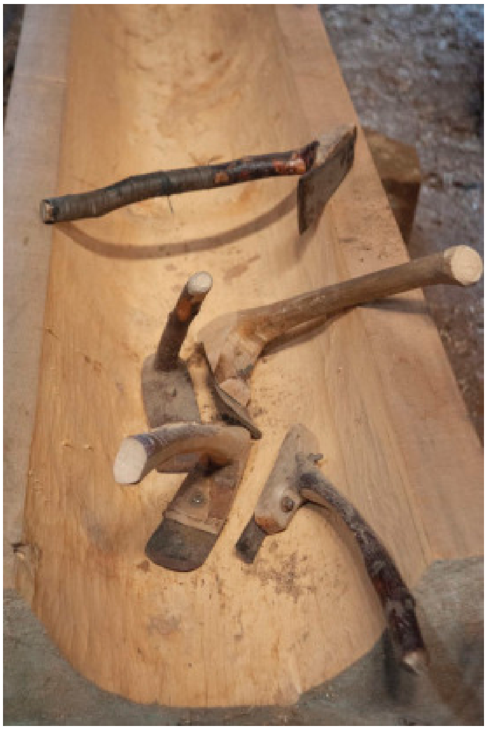
Protected Cedars – Haida Gwaii is one of the few places left on earth where truly monumental cedars grow. They're protected both by the Haida and the government to keep logging companies from clear cutting them completely.

Amazing trees

The monumental red cedars of the Pacific coast rainforest enabled the Haida to build their largest canoes. Old-growth rainforest dominates the landscape, and the forest is filled with massive stumps left from the harvest of western red cedars and Sitka spruce, the predominant species on the islands.

First, the canoe carver has to find a suitable tree. It must be big enough for the intended canoe and without the twisting growth pattern that sometimes occurs in red cedar. Fresh greenery at the top indicates it's probably a viable tree, but test holes are cut to make sure the heartwood is free of rot. Because cedars are found in boggy ground, excess water drawn up through their root systems can cause the tree to rot from the heartwood out.

Historically, cutting down a tree of these proportions took a lot of patience. First, an interlaced nest of hemlock and other small trees was prepared to cushion the tree's fall and prevent it from fracturing. The person chosen to fell the tree—who might not be the



Tool Collection – A collection of handmade adzes in Christian White's shop. The handles are made from alder and the blades are shaped and honed from automotive springs and other available metals before being bolted onto the handles.

Form Follows Function – Canoes were shaped for different purposes. This boat was purposely narrow to give it speed and agility when hunting seals.

carver—started by cutting out a small groove girdling the tree. Once he had enough space to work, he coated the top of the groove with mud as a fire retardant and set a fire in the lower section. As the wood charred, he used an adze to chip out the charcoal. The process was repeated until the tree came down.

Today, the process isn't limited by technology, but by laws that protect the remaining monumental red cedars, which are becoming increasingly rare. The Haida Gwaii Cultural Wood Access Permit program is a joint effort between Canada's Ministry of Forests and Range Act and the Council of the Haida Nation. It's meant to provide a long-term source of wood for traditional Haida nation artisans, such as canoe and pole carvers. Before a carver can cut down a tree, he must file an application with specific volume requirements, project blueprints and letters of support. An advisory board made up of representatives from the Haida council, the ministry, villages and hereditary chiefs reviews applications.

Despite advances in technology in felling trees, the adze remains the most important tool for carving canoes. Adze blades are now made from steel, but their elbow-shaped handles are still fabricated from the crooks of red alder roots. White believes that before iron was introduced through trade with Russian fur traders, jade was most likely used for adze blades, since it is tool-hard and holds an edge for a long time. Jade is not native to Haida Gwaii, but the islanders traded for it with mainland peoples like the Tsimshian.

The coastal tribes were all traders, and iron had become an important commodity for the Haida even before their own first contact with Europeans. Mainland tribes in Russian Alaska traded scrap iron for canoes.

Bennett told me a story reflecting iron's importance: "A chief and his two sons found a mast floating in the water from a sailing ship that probably sank. Around its top it had an iron band, the kind you attached rigging to, so there was a lot of good iron in it. That much iron would make any man a chief in his village [and] very rich. The old man hopped into the water to try to take the iron off but couldn't budge it. They were going to need tools but didn't have any in the canoe. The old man told his sons, 'I'll be all right. You paddle to the village and bring back the tools.' But it was a long way to the village, and the old man had to spend the night on the spar. The next day, when the boys got back, they could see their father sitting on it. He was tired and cold, but he had his iron and was a very rich man in his village."

Form follows function

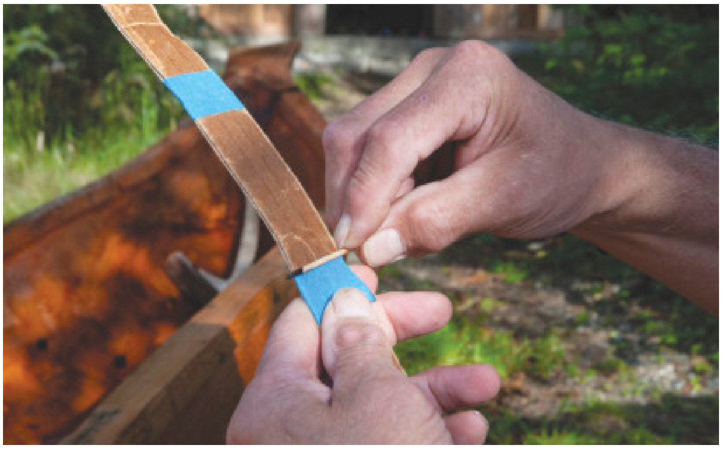
After the chosen tree was felled, the carver worked on the outside, first giving the canoe its shape. A canoe used for inshore seal hunting would have a flatter bottom than an offshore canoe, giving the seal hunter more speed for the pursuit. The bow would be flared to keep the canoe dry as it worked in heavy seas, and it also gave the harpooner a support for his weapon and a stable platform to throw from. A voyaging canoe would have a rounder bottom with more rocker (the curve – or sheer line – from bow to stern along the length of the boat), more flare to the sides and higher ends.

In shaping the exterior, the builder had to form a reverse sheer, a kind of hump in the middle. The reasoning was that the canoe would eventually be filled with boiling water to soften the wood so the sides could be bent outward to give them considerable flare. Such bending has the effect of lowering the sheer line midway along the hull and the builder had to predict how much material he had to leave to account for the bend. Done right, the final sheer line would be eye sweet.

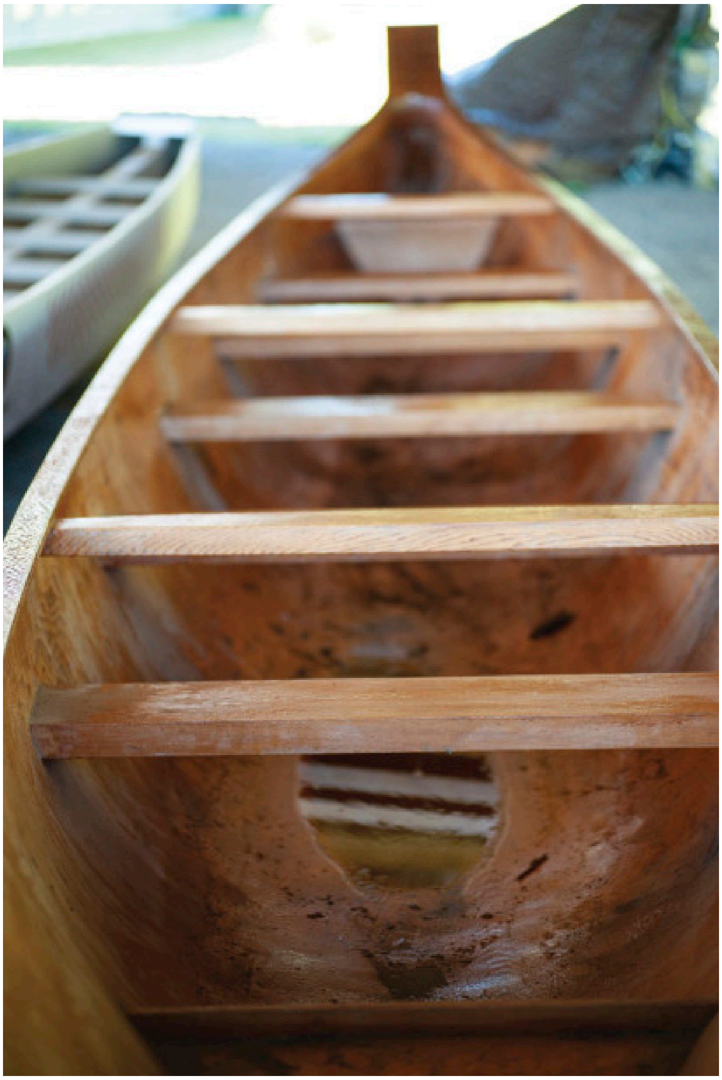
With the exterior shaping completed, the hull would be partly dug out to reduce the log's weight. The boat then had to be dragged down to the coast, sometimes from places miles from the sea. Canoe building began in late fall, after food had been gathered for the winter.

The timing has nothing to do with sap production, since trees in this temperate climate don't go dormant like they do in eastern North America. Carvers worked all winter, then in the spring skidded their boats down to the water's edge so they could be towed to the village. Boats would be pushed over muddy ground, or on log rollers. If a canoe was not ready in time for the spring fishing season, work was set aside until the following winter.

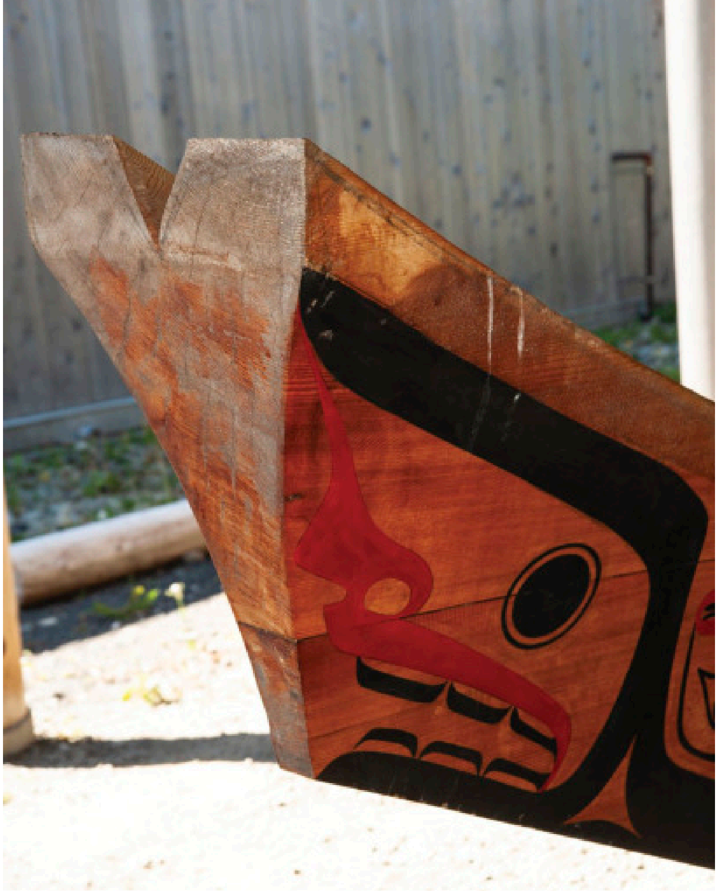
When the canoe arrived at the carver's village, the next project was to boil it to flare the sides out, which also had the effect of raising the ends.



Measuring Hull Thickness – First carved to shape, Haida canoes are then dug out with a number of different tools. Measuring the hull thickness without calipers presents its own problems. John Bennett solved this by making a story stick from cardboard and, combined with stiff wire wrapped in tape, inserted it into a small through hole. This allows him to work the hull to a precise thickness.



Canoes Are Kept Damp – Finished canoes are kept damp to prevent them from drying and checking. Even under shelters, like the one at the Haida Heritage Centre at Skidegate on Haida Gwaii, water must be added to the hulls to preserve them.



Taking Aim – The bow of this canoe is designed for seal hunting and whaling. The V-notch in the high bow (high bows break rough seas, preventing the boat from flooding) is a rest for the harpooneer to place his lance or harpoon where it will let him strike quickly.

First, the hull was hollowed to its rough dimensions. The thickness of the sides and bottom was carefully measured using pegs of a specific length and painted with pigment on their inside ends. These pegs would be driven into strategically placed holes along the length of the boat. They would be set flush on the outside, then the inside of the hull would be carved with adzes and chisels until the coloured heads of the pegs were flush with the surrounding wood.

Bennett, however, uses a different method to measure the thickness of his hulls. He pushes an adjustable wire probe through a 0.3-centimetre hole in the hull until it emerges on the other side. The tip of the wire is black and extends through the inside of the hull. The probe's body is white and, using tape as a stop, he can set the depth he needs. The white portion of the probe is measured against a tapered cardboard template. The cardboard's widths represent the finished thickness of the hull at corresponding points around the circumference of the exterior.

When the probe appears on the inside of the hull, Bennett measures the difference between the black and white sections and uses that measurement to drill a larger-diameter hole from the interior outward with tape on the drill bit marking the required depth. Then he shaves the hull down with an adze and inshave until the larger hole disappears, leaving him with just the smaller hole, which is then easily plugged.

After the inside shaping of the hull is finished, it's time to boil the canoe for bending. First, hemlock boughs are placed in the hull to protect its interior surfaces. Traditionally, the hull was filled with a mixture of water and urine, which has a nitrate content that increases the wood's flexibility. Today, hulls are filled with a mixture of fresh water and ammonia. The water is brought to a boil by heating rocks to red-hot over a fire, then transferring them one-by-one to the water.

Bennett told me he uses only round river rocks so the hull isn't gouged by sharp edges. He also uses white stones exclusively, because they are less likely to explode than dark ones.

The boiling is kept up by continuing to drop hot rocks into the water. Depending on the size of the canoe—and historically some of them reached 70'—the wood becomes flexible after a day or more, and then the hull can be bent to its final shape. Sometimes, a hull can become so flexible that the carver drives stakes around the perimeter to keep the sides from flaring out too much.

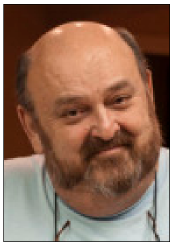
When the bending is complete, the water is drained off and the wood allowed to cool. Then, the final finishing can begin. Rail caps and thwarts are added. Traditionally, the hull was "sanded" using volcanic rock and sandstone. Today, belt and orbital sanders take the place of the rocks.

Extensive decorations usually incorporated mythological creatures that were important to the carver if the boat was ceremonial – if not, it would be left plain. The canoe would be honoured in a ceremony upon launching.

White believes that Haida adapted sails for their canoes only after their first contact with Europeans. Woven cedar bark or spruce roots were probably used at first, eventually supplanted by canvas. The canoes are reported to have sailed as well as they paddled. One famous canoe, named TILLIKUM, sailed around the world at the turn of the 20th century. The boat was from the Nuu-chah-nulth tribe on Vancouver Island but similar to the Haida style.

With the abundance of fish and gigantic cedars, Haida craftsmen could draw on the resources of their immediate environment for everything they needed, and the rich culture they established created one of the most admired artistic forms in the world.

Cedar made life on the islands possible. Cedar bark made rope and cloth, and mortise-and-tenon-joined cedar posts and beams supported longhouses; riven cedar planks sheathed them. Cedar was the foundation of a rich heritage of woodcarving and, above all, cedar logs made possible the canoes that allowed the Haida to draw on the sea resources that surrounded them. Canoe carving today not only reconnects Haida with their legacy but with their environment.



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MAKE A STYLISH GIFT BOX FOR PENS

Photos by James Dobson Illustration by Len Churchill

The only thing better than giving someone a turned pen is presenting it in a custom-made box.

BY JAMES DOBSON

Turning pens was my gateway into woodworking. They can be as easy or as difficult as you want them to be, and they make fantastic gifts. But simply handing a hand-turned pen to someone seems too casual, too mundane. But put that same pen in a special box and suddenly the gift-giving experience is elevated to something else entirely. These presentation boxes are a simple build that you can finish in a single day and will perfectly showcase your pen-turning abilities.

I'm batching out three versions of this box so you'll notice the wood species changes throughout the photographs. You don't need a lot of lumber for this project, so I went through my scrap bin and found some walnut, ash and boxwood. Make sure you can get all the parts out of a single board. Differences in grain patterns and colour can really show in a small project like this.

Breakout

There are two basic approaches to breaking out the parts for these boxes. One is to cut your parts from the blank in the order they will go back together in during assembly. Cut your left side, then your front, then the right side, followed by the back. This ensures continuous grain and colour all around the front and sides of the box.

I chose another approach for a couple of reasons. As these parts are so short, and the grain and colour in the material I was using was fairly straight and even, the grain and colour don't change much. This option also makes it a bit easier to machine these small parts, as they're all ripped to width while still part of a large blank.

Start by dimensioning your lumber. I'll show how to do this with machines, but the small size of this project makes it a good candidate for hand tools. Flatten one face and one edge on the jointer and then plane down to a thickness of 1/4". At the table saw, set your fence for a rip cut based on the widest required component, which is the lid. Make sure your flattened edge is against your table saw fence and that you're cutting off your uneven edge. Using a table saw sled or your mitre gauge with a sacrificial fence, crosscut the lid to length. If you're batching out multiple boxes, use a stop on your fence to ensure each lid piece is the same length.

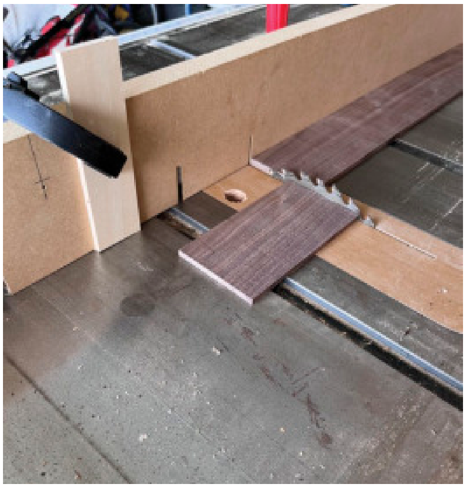
Set up your fence at 2" for another rip cut for the short sides. With your cut complete, move back to the sled or mitre gauge for the crosscut. This time, use a stop even if you're only building one box. You need to ensure both short sides are exactly the same length.

Repeat this process for the long sides. Set your fence at 1-3/4", rip, and then crosscut to 6-1/4" using the stop to make sure your long sides are also exactly the same length.

Box bottom

Set your stock aside for a moment and turn your attention to the box bottom. I'm using 1/8" plywood covered with fabric. I salvage a lot of 1/8" plywood from shipping materials and fruit crates. It's often of somewhat poor quality but I can usually work around the defects to find enough for bottoms for small boxes like these. The fabric bottoms are a nod to Connecticut box builder Matt Kenney, who has been including this detail in his boxes for years.

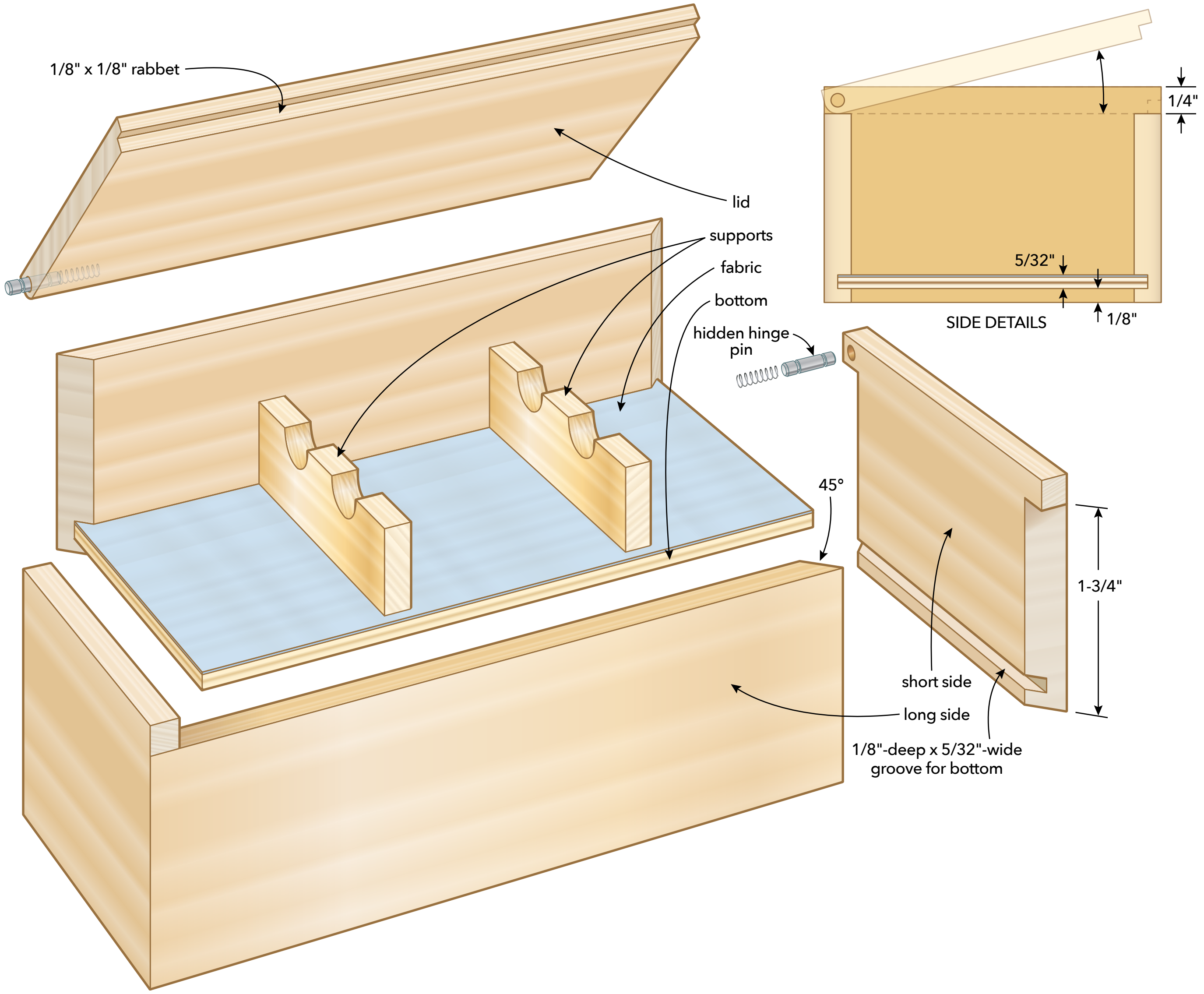
Look for fabrics with a small print that won't overwhelm and in colours that complement your wood species. You need only a small piece, so quilting squares are often a good choice. You can always skip the fabric and just veneer the plywood. In any case, I treat the fabric like a veneer and spread a thin, even layer of glue on the plywood, ensuring the glue comes right to the edges, and then apply an oversized piece of fabric. It should hang over each edge by about 1/4". Clamp this between two cauls (blocks of wood covered in packing tape to ensure the glue doesn't adhere to them). Because I'm batching boxes, I've made a stack with cauls between each layer. Allow the glue to dry and then trim the fabric flush with the plywood.



Set a Stop – Setting a stop on your mitre saw or table saw will ensure all the workpieces are cut to the exact same length.

Cauls and Clamps – Adhere the fabric to the bottoms with glue. Use cauls slightly larger than the bottoms between each lamination to even out the pressure.

Ready for Mitres – These box parts are cut to size and have the bottom grooves machined in them.


1/8" x 1/8" rabbet
lid
supports
fabric
bottom
hidden hinge pin
45°
short side
long side
1/8"-deep x 5/32"-wide groove for bottom
1-3/4"
1/4"
5/32"
1/8"
SIDE DETAILS

Return to your box sides, and cut a groove 1/8" wide and 1/8" deep, 1/8" from the lower edge of each side with your table saw or router table. Your bottom will sit in this groove. Because we've added fabric to the plywood, it will now be slightly thicker than 1/8". Nudge your fence over slightly, 1/32" or so, and widen your groove. Check to see if your bottom fits snugly. If you need to widen it more, do so until the bottom fits well. There's nothing wrong with cutting the grooves to accept the bottom after you mitre the corners of the box, as there will be less chance of tear-out near the grooves.

Mitred corner joints

These are simple mitred boxes with 45° angles on each corner. You can

Mitre Time – Dobson uses his plane and shooting board to cut the mitres on the ends of the workpieces.

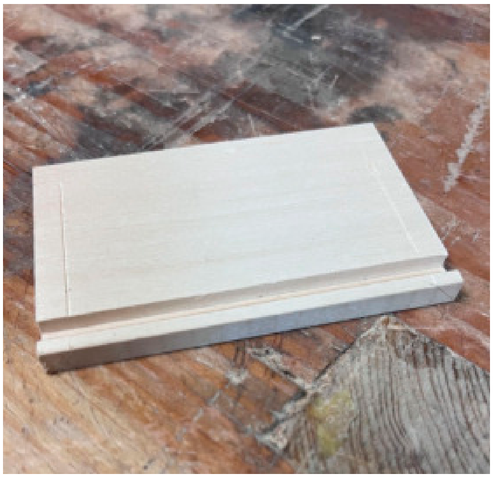
Sides Are Tricky – The sides need a stopped mitre as they extend above the front and back pieces. Mark the mitre on the lower edge to help guide you.

Materials List

Part	Qty	T	W	L	Material
Short Sides	2	1/4	2	3-1/8	Hardwood
Long Sides	2	1/4	1-3/4	6-1/4	Hardwood
Lid	1	1/4	3-1/8	5-3/4	Hardwood
Bottom	1	1/8	2-7/8	6	Plywood
Supports	2	1/4	3/4	To Fit	Solid Wood

Hardware List

Name	Qty	Size	Details	Supplier
Hinges	2			
Fabric	1			



All Marked Up – Proper layout will go a long way to having success with these stopped mitres.

cut the mitres on the long sides at the table saw, but I prefer to use my 45° shooting board because it takes no time to set up. Align the long sides with the fence and plane the end grain away. Count the number of passes it takes to complete the mitre. Depending on the wood species, it took me 15 to 18 passes. It really doesn't take long. Use the same number of passes on the other edges to make sure your sides stay the same length.

The short sides are complicated by the fact that the design calls for stopped mitres. These will need to be cut differently. You could cut these on the table saw, but this is another operation where hand tools are more efficient.

Start with the layout. Use a square to mark where the mitres need to stop. The portion of material that will remain unmitred equals the thickness of the lid. Set your marking gauge to the thickness of the short side and then scribe a line on both edges of the inside face from the lower edge of the box up to the line marking the stop. Turn the side so the lower edge of the board is facing up and mark a 45° angle on the edge connecting the scribed line with the corner of the board.

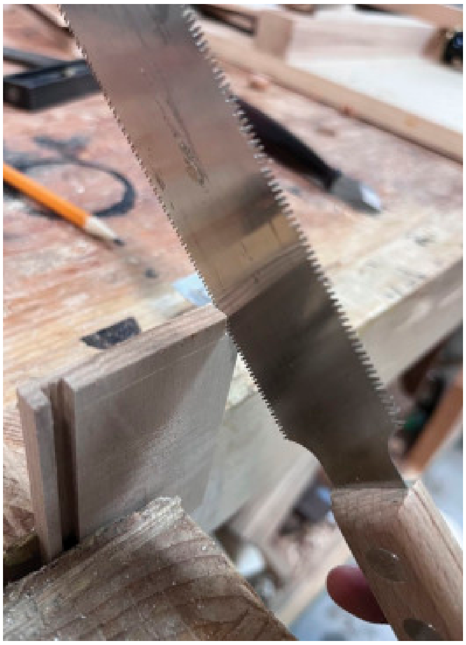
Using a fine-toothed hand saw, make a cut on the waste side of the stop line, connecting the outer edge and the scribed line. Be sure not to cut into the show face of the board. Turn the side back on its edge and saw away as much of the waste from the mitre as you can to make the next step easier. It's better to leave extra wood here than to cut into the show face. With the mitres roughed out, clamp a block of wood with a 45° angle cut on one face against the scribed line. Use a freshly sharpened chisel registered against the angled back to pare the sides to a perfect 45°.

Hinge holes

You now need to drill the holes in the sides for the hidden hinge pins. Use a marking gauge and an awl to mark the point 1/8" from the top and 1/8" from the rear edge on the short sides. Make sure the holes will both be on the rear, rather than the front, of the side when the box is glued together. Use a 1/8" drill bit to drill 3/16" deep holes at that point. A strip of tape can be used to set the depth. Don't use a brad point drill bit to ensure you don't go all the way through with the small centre spur.

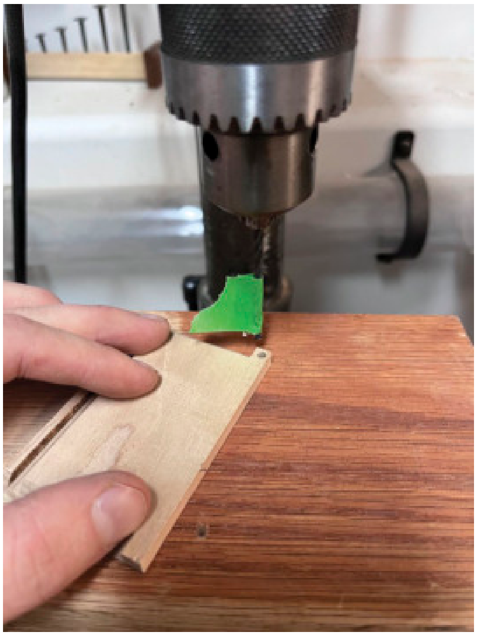
Sand and assemble

Pre-finish the inside faces of your edges in preparation for glue-up. Sand the parts, then coat them with your favourite finish. Linseed oil or shellac are good options. I like to avoid finishes with strong odours, especially inside boxes. Ensure the faces of the mitres stay free of finish.

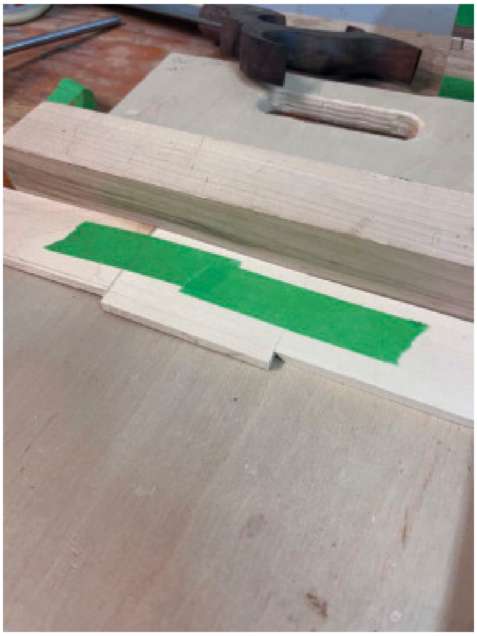


Start with the Saw – Use a hand saw to remove most of the waste. Start with a notch just below the stopped portion of the joint, then cut at an angle, across the grain, to start to shape the mitre.

Pare the Waste – Dobson uses a block with a 45° mitred edge to help guide his chisel as he pares away the waste.



Tiny Holes – A shallow, accurately located hole needs to be bored in the upper back corner of each side. Mark the centre with an awl, then use your drill press to bore the hole. Be sure not to bore too deeply or the hole will be visible on the other side and the hinge won't work.

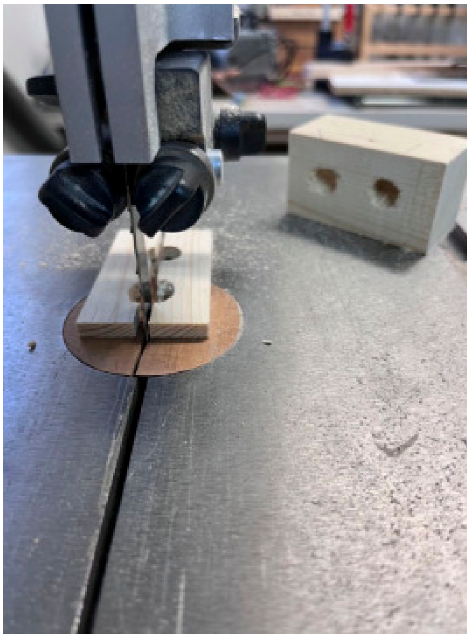


Tape Works Great – When stretched over each joint, masking tape will act as a clamp to bring the joints together. Apply it to the back of each joint with the mating edges butted together.

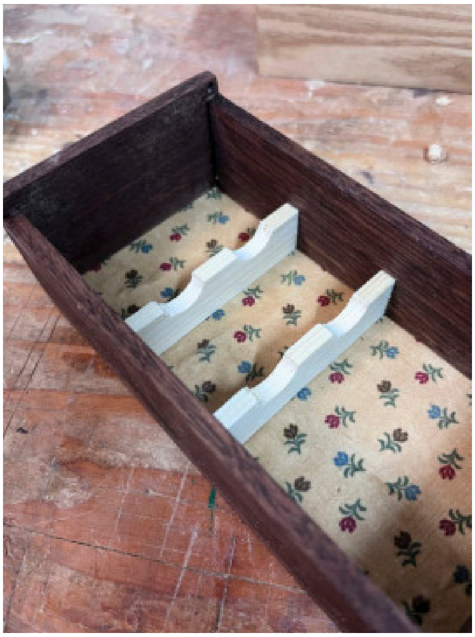
Let It Dry – Tape surrounding the box will hold the joints in place until the glue dries.

Once the finish is dry, prepare for the glue-up. Start by aligning one short side and one long side, show-face up, against a straightedge. I'm using the fence on my shooting board, but you can use your table saw fence or any other straightedge. Use a strip of masking tape stretched over the joint to connect the two pieces. Add the next short side and then the final long side, both with more tape.

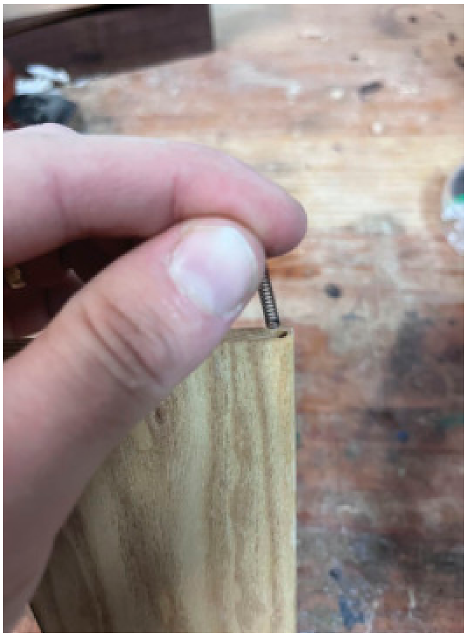
Flip the assembly over and apply glue into the valleys created by the mitres. Aim for thin coverage on both sides of the joint. Apply a small amount of glue in the bottom grooves. Place your bottom piece into one groove, ensuring your fabric is the right way up, then start folding the sides around it. One more piece of tape to connect the edges will keep it together. You can use clamps, but I find wrapping small



Divide and Conquer – Once the two holes are bored in a blank and a strip has been cut from the blank, rip in half with a bandsaw or hand saw before smoothing it with sandpaper.



Friction Fit – The pen holders are secured with a friction fit to allow the recipient to repurpose the box if they wish.



Add the Hinge – The hinges can be inserted into the holes in the lid and the lid can be installed. Once installed, the lid can't be removed, so ensure you're ready for this step.

boxes like this with masking tape works better, as clamps can apply so much pressure the box flexes, causing the joints to not align properly. Keep the tape stretched as you work a single piece around all four sides. Two strips of tape should provide enough pressure. Double check for square, then set aside.

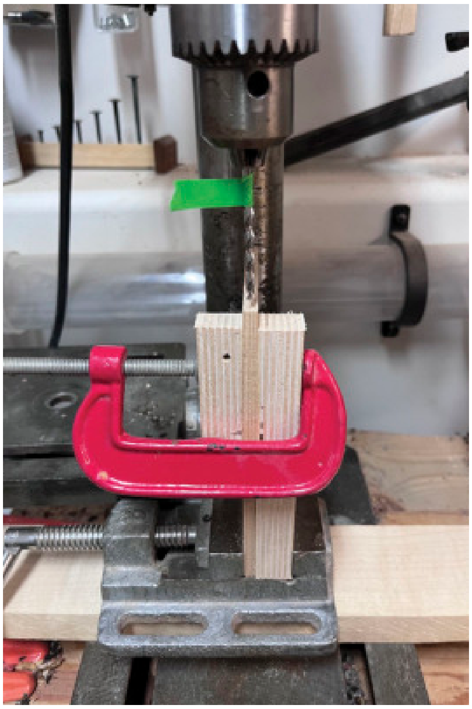
The lid

The lid looks simple, but there are some tricky operations here. Before you do anything, ensure your lid fits the glued-up box. Use a shooting board or your table saw to make any necessary adjustments.

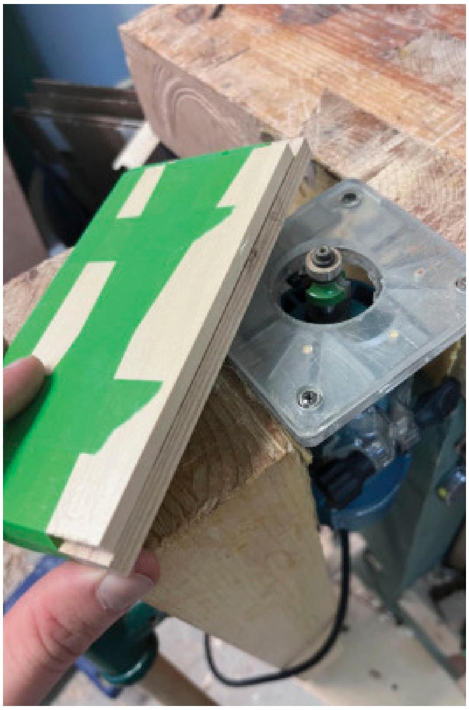
The holes for the hinges are the most critical part of the entire project. I highly recommend using a drill press for this operation. Mark the centre of the holes 1/8" from the side and 1/8" from the rear edge. Use an awl to give the bit a starting point. I use a brad point bit for this hole. You don't want to drill into an unsupported board so clamp two pieces of scrap along with your lid board to ensure it's well supported. Ensure your lid is parallel to the bit and then drill 1-3/8" into the lid. Repeat on the other side.

To ensure you have clearance to open the lid you need to add a 1/8" round over to the rear bottom edge of the lid. Unfortunately, working with stock this thin means that the bearing on most router bits may not catch the solid edge and cause damage. You can get around this by taping a fence along the top of the lid for the bearing to run against. Another approach is to use a block plane.

Finally, cut a 1/8" × 1/8" groove on the underside of the front of the lid to act as a pull. I did this at the router table, but you can easily do it on the table saw, too. Even a chamfer with a block plane will give you a positive edge to grasp while opening the lid.



Careful Drilling Operation – Use some scraps to ensure the lid is parallel with the drill bit when you drill the hinge hole in the side of the lid.



Rout a Round Over – Dobson secures an auxiliary fence on top of his lid so the router bearing will run on it. This operation can also be completed with a block plane.

Apply a finish

Remove the tape from your box and sand it and the lid to prepare for finishing. I like to add a strip of milk paint in the groove on the lid. Pick a colour that matches your fabric and accents your wood selection. A little splash of colour on the outside of the box can do wonders to make it stand out. Finish with the same product that you used on the interior.

Pen supports

To support the pens inside their boxes I friction-fit two pieces of pine between the front and back. I don't glue these in because I want the recipient to be able to repurpose the box if they wish. I often use pine for the supports, but the choice is yours.

Start by drilling two holes in a piece of straight-grained 2x4. Holes should be sized according to the diameter of your pens. As you cut these to size they will become fragile, so drilling the holes first will save you the frustration of splitting the piece. Rough cut it to length and width at the bandsaw or with a hand saw and then cut in half, leaving semi-circles that will cradle the pens. Using a shooting board and a sharp plane, clean up the edges and size them until they fit nicely into the box. A pass with a 1/2" drill-mounted sanding drum will quickly smooth the cradle if your drill bit didn't leave an even surface.

Final assembly is done by inserting the hidden hinge pins. Once you have installed these there is no way to disassemble unless

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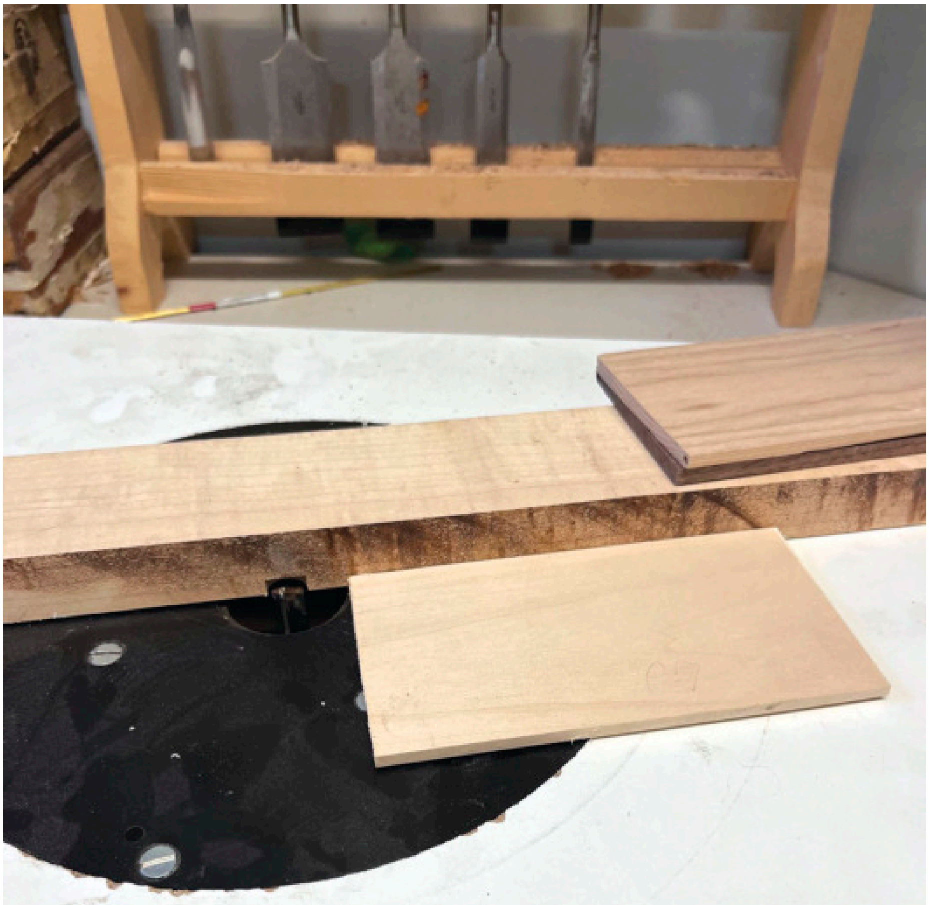

Sand It Clean – Once a contrasting paint colour has been applied to the lid handle rabbet, use sandpaper and a block to sand any excess paint off the mating surfaces.

Tiny Rabbet – A simple straightedge clamped to your router table will guide your lid across a straight router bit to add the small recess that acts as a handle to open the box lid.

you follow the instructions for the pins and include an access slot. I haven't included this because I don't care for how it looks. Ensure your round over provides enough clearance. Put a spring into each of the holes in the lid and then insert the pins. Push the pins into the lid by compressing the spring and then align the lid on the box. Allow the springs to push the pins into the holes drilled in the side of the box. This will lock the lid in place for good.

Now you're ready to fire up the lathe and turn a couple of your favourite pens.

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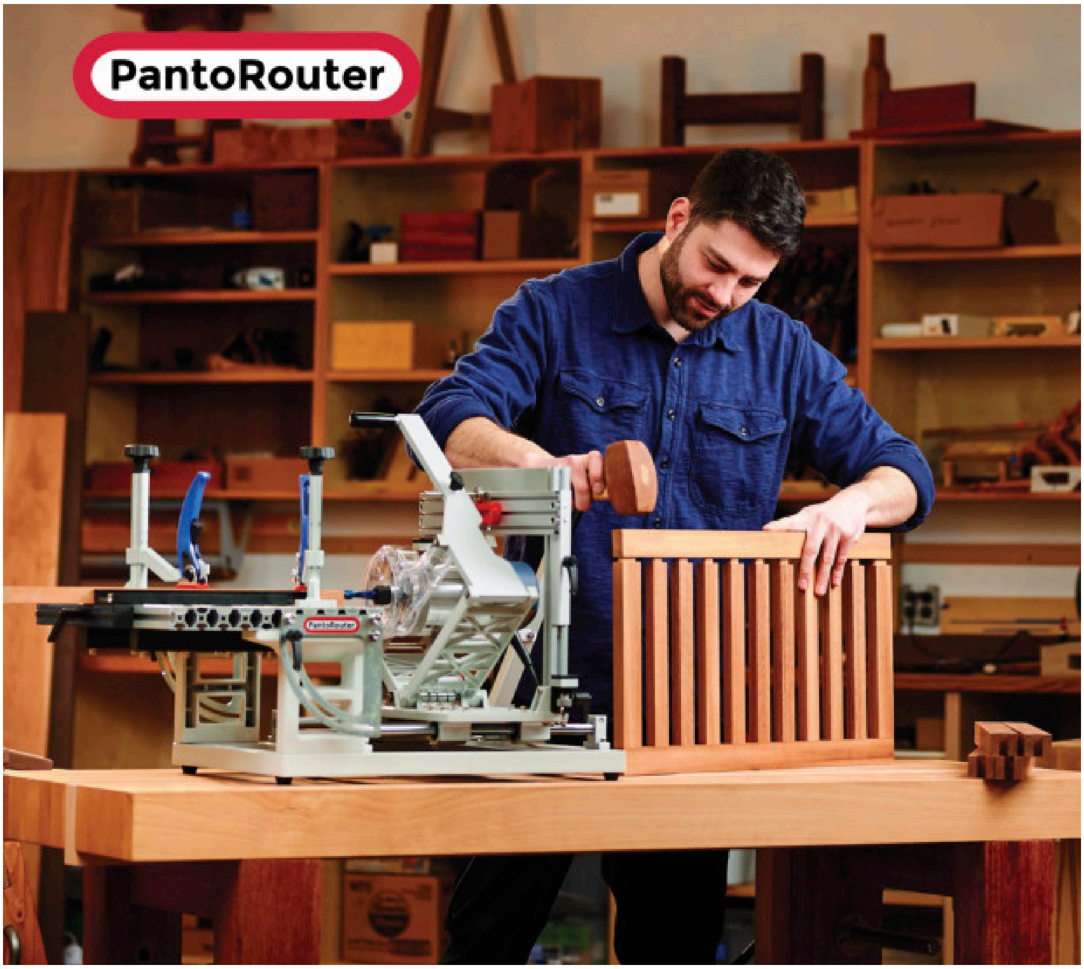

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CSC SYS 50: The Ultimate in Portable Precision

The **Festool CSC SYS 50 Cordless Table Saw (#577378)** is so compact that it fits into a Systainer. It's just as versatile in use, as it's tremendously convenient in size. Make rip cuts of up to 11" (280 mm), crosscut widths of up to 17-3/4" (450 mm) and bevel cuts of -2° to 47°. The unique digital operation produces results with maximum precision, with accuracy within a tenth of a millimetre (1/256"). The 2x18 V dual battery system and brushless EC-TEC motor deliver the power and torque you expect from a corded table saw. The UG-CSC-SYS underframe collapses for easy transport from the vehicle to the jobsite.

FestoolCanada.com

Versatility and power for all your drilling and driving tasks

The **Einhell Cordless 1/2" Drill/Driver & 1/4" Impact Kit (#4257245)** is the ideal drilling and fastening tool kit for DIY enthusiasts and professionals alike. Powered by an 18V brushless motor with electronic speed control, the drill/driver has variable speed ranges of 0 - 400 and 0 - 1,500 RPM. The impact driver has a 0 – 2,300 RPM range and a maximum torque of 140 Newton metres (Nm). For optimum visibility in the work area each tool include an integrated LED light. This kit comes with two 2.0 Ah batteries, charger and carry bag.

Einhell.ca

Optimum power to loosen and tighten the toughest nuts and bolts

The **Einhell PROFESSIONAL Cordless Impact Wrench & Driver (#4510071)** is the ideal tool for anyone who frequently encounters stubborn fasteners or needs to exert significant force during assembly or disassembly tasks. The 18V brushless motor delivers speeds of 0 - 2,100 RPM, an impact rate of 0 - 3,300 and a maximum torque of 3,540 in/lbs. It comes with a robust 1/2" external square drive mount, and there is also an LED Light for optimum illumination of the work area. Also included are a 1/4" bit adapter for screwdriving and 3 impact sockets (17, 19 and 21 mm) for changing vehicle tires. Battery and charger sold separately.

Einhell.ca

Convenient and efficient cleaning for shop or home

The **Einhell 18V Cordless Deluxe Handheld/Stick Vacuum (#2347195)** is a is a convenient and efficient solution for tackling small messes around the home or workshop. Powered by an 18V battery, it offers two speed settings (Eco and Boost) with up to 36 CFM of airflow for optimized battery performance. The large 20.3 oz. (600ml) dust container is easily emptied, while the air filter can be conveniently cleaned under running water. Included are five versatile accessories and a hanging bracket, expanding the vacuum's capabilities for a variety of cleaning tasks. Battery and charger sold separately.

Einhell.ca

Ideal for quick spills, spot cleaning and regular floor maintenance

The **Einhell 18V Cordless Power Wet Mop (#3437120)** offers a convenient, efficient and hygienic way to clean hard floors. With a 2.0Ah battery, you get up to 85 minutes of cleaning time, and this can be extended to 345 minutes with an 8Ah battery. The 11.4" wide roller is ideal for cleaning hard floors, parquet, laminate, PVC, linoleum, and tiles. It features a slim design, a self-standing function, and a convenient roller-cleaning function when placed on the parking/cleaning station. A cleaning tool is included for removing hair or similar debris from the roller. Battery and charger sold separately.

Einhell.ca

Versatile and powerful multi-purpose work light

The **Einhell 18V 3600 Lumen Cordless Folding Panel LED Work Light (#4514176)** is a versatile and convenient tool for illuminating a wide range of tasks on the job site, in the shop and around the home. Powered by an 18V battery, it features 60 high-output LEDs that deliver a total of 3,600 lumens of bright, neutral white light (5700K). This powerful light can illuminate areas up to 32.8 feet. The work light boasts adjustable folding panels, enabling illumination up to 270°. Furthermore, it can be mounted on a tripod using standard 1/4" or 5/8" threads. Battery and charger sold separately.

Einhell.ca

Sleek, convenient and versatile one-hand cutting

The **Einhell 18V Cordless Compact One-Handed Reciprocating Saw (#4326318)** is a valuable asset for a wide range of DIY and light-duty projects. Powered by an 18V battery, this lightweight (2.5 pounds) saw delivers impressive cutting performance. With a 2.0Ah battery it can achieve up to 242 cuts in 1-3/8" round lumber, and this capacity increases to up to 976 cuts with an 8.0Ah battery. Featuring variable speeds up to 3,000 strokes per minute (SPM), the saw provides precise control for various materials. It boasts a 2" cutting depth in wood and 5/32" in metal. The tool-less blade change system ensures quick and easy blade swaps, while the adjustable soleplate optimizes blade performance. Battery and charger sold separately.

Einhell.ca

Monocoat Wood Oil for Low-Traffic Surfaces

LIGNA
Huiles d'origine naturelle pour le bois
Oils of natural origin for wood
PRONTO
946 ml
CAUTION / ATTENTION

PRONTO by LIGNA is a monocoat oil finish that colours, protects, seals and enhances wood grain, leaving no surface film. Its penetrating power nourishes the wood while facilitating maintenance. PRONTO is user-friendly, has no overlap effects and provides a durable finish that's easy to refresh. It can be used on all interior wood surfaces subject to low-traffic levels, such as unfinished or stripped furniture, walls, ceilings, mouldings, doors and windows. Woodworkers appreciate PRONTO for its excellent value and outstanding versatility. PRONTO is LIGNA's best-selling flagship product. It's now 100% made and packaged in Canada.

LIGNA.ca

Water-Repellent Wood Oil for Exterior Surfaces

LIGNA
Huiles d'origine naturelle pour le bois
Oils of natural origin for wood
EXTÉRIA
Huile hydrofuge protectrice
Protective Water Repellent Oil
946 ml
CAUTION / ATTENTION

EXTERIA by LIGNA is a water-repellent oil finish that colours, protects, seals and enhances wood grain, leaving no surface film. It's easy to use and has no overlap effects. EXTERIA is the right choice for finishing your brand-new terrace. It can be used on all exterior wood surfaces such as unfinished or stripped furniture, walls, decks, docks, beams and woodwork. After applying EXTERIA, the surface will be well protected against wear, stains, moisture, fungi and UV rays for many years. This product doesn't peel or flake, and there's no need to sand to refresh the finish.

LIGNA.ca

Monocoat Oil with Catalyst for Wood & Epoxy Surfaces

DUO by LIGNA is a catalyzed monocoat oil finish system that protects, seals and enhances wood grain leaving no surface film. DUO has no overlap effects and provides outstanding tolerance against wear, abrasion and humidity, and chemical and mechanical attacks. It can be used on all interior wood and epoxy surfaces but particularly tables, countertops, kitchen islands and worktops. This product is recommended for finishing "epoxy river" or "live edge" style furniture. The use of Catalyst substantially improves performance, drying speed and reduces curing time by one-third. DUO is the appropriate alternative to epoxy finishes where consumers require a lower gloss finish.

LIGNA
Huiles d'origine naturelle pour le bois
Oils of natural origin for wood
DUO
946 ml
CAUTION / ATTENTION

LIGNA.ca

Solvent-Free Monocoat Wood Oil for Food Surfaces

LIGNA
Huiles d'origine naturelle pour le bois
Oils of natural origin for wood
BIO-SUPRA
946 mL
CAUTION / ATTENTION

BIO-SUPRA by LIGNA is a solvent-free monocoat oil finish that colours, protects, seals and enhances the wood grain, leaving no surface film. BIO-SUPRA is user-friendly and has no overlap effects. It's the right choice for finishing your wood food surfaces. However, it can be used on all interior wood surfaces such as woodwork, butcher's block, cutting boards, furniture and floors. According to the company's research, BIO-SUPRA is the only topcoat oil certified by Health Canada's Bureau of Chemical Safety for food surfaces. This product is frequently used in restaurants and grocery stores that require a certified solvent-free surface with zero VOC emissions.

LIGNA.ca

Monocoat Wood Oil for High-Traffic Surfaces

LIGNA
Huiles d'origine naturelle pour le bois
Oils of natural origin for wood
EASY-SOLO
Huile monocouche pour plancher
Monocoat oil for wooden floor
946 mL
CAUTION / ATTENTION

EASY-SOLO by LIGNA is a monocoat oil finish that colours, protects, seals and enhances wood grain, leaving no surface film. EASY-SOLO is user-friendly, has no overlap effects and provides excellent abrasion resistance. It can be used on all interior wood surfaces subject to high traffic levels, such as unfinished or stripped floors, tables and worktops. After applying EASY-SOLO, the surface will be well protected against wear, stains and humidity for many years in only one coat. This product is appreciated by professionals for its high resin content and ability to finish a job quickly.

LIGNA.ca

Water-Repellent Hybrid Wood Oil for Exterior Surfaces

LIGNA
Huiles d'origine naturelle pour le bois
Oils of natural origin for wood
HYBRI-DECK
946 mL

HYBRI-DECK by LIGNA is a hybrid water-repellent oil finish that colours, protects and seals, leaving no surface film. HYBRI-DECK is a technical innovation that combines vegetable oil and water, with low VOC emissions. It can be used on all exterior wood surfaces such as unfinished or stripped furniture, walls, decks and beams. After applying HYBRI-DECK, the surface will be well protected against wear, stains, moisture, fungi and UV rays for many years. This product doesn't peel or flake, there's no need to sand to refresh the finish, and projects can be done in less than 12 hours.

LIGNA.ca

Portable power when you need it

Power outages can last for hours, days or even weeks, and they can be costly if you're not prepared. The King Canada 3800W Gasoline/propane Inverter Generator (KCG-3800I-DF), with its 5 HP, 4 stroke air cooled OHV engine will help make power outages considerably more manageable. Unlike a traditional generator, an inverter generator has a more sophisticated mechanical process that delivers more stable and efficient energy along with a longer run time and less fuel use. It has a smaller environmental footprint and generates lower toxic emissions. You'll also find it quieter to run and easier to maintain than a conventional generator.

KingCanada.com

The ultimate cleaning solution for homeowners and DIYers

Effortlessly tackle tough cleaning tasks with the King Canada 3200 PSI Gasoline High Pressure Washer (KPW-3200). Powered by a robust 7 HP, 4-stroke engine, it delivers a potent 3200 PSI of water pressure and a maximum flow rate of 2.5 GPM, effortlessly blasting away dirt, grime, and mildew. Experience convenient operation with an easy-start recoil starter and essential safety features. These include a thermal relief valve and a low oil shut-off, ensuring reliable and worry-free use. Equipped with a stainless steel wand, 30 feet of durable hose, and 5 quick-connect nozzles, this pressure washer offers the versatility to tackle a wide range of cleaning challenges, from cleaning driveways and siding to rejuvenating lawn equipment.

KingCanada.com

Get a Superior Finish with a Helical Cutter Head Jointer

Enhance your woodworking with the King Canada 10" Benchtop Jointer with Helical Cutterhead (KC-10HJC). Ideal for workshops with limited space, this benchtop jointer delivers the same precision and performance as a full-size stationary model. Equipped with a cutterhead featuring 20 replaceable two-sided high-speed steel inserts, this jointer ensures consistent and smooth cuts. Simply loosen the holding screws and rotate the inserts to reveal fresh cutting edges, extending tool life and minimizing downtime. The staggered arrangement of these inserts creates a continuous cutting surface across the entire width of the cutterhead. This unique design minimizes grain tear-out and fuzzing, resulting in a superior finish for your projects.

KingCanada.com

Sharp tools give cleaner cuts

The King Canada 8" Low Speed Bench Grinder (KC-895LS) is the ideal solution for sharpening chisels, plane blades, drills, and more, empowering you to achieve professional-grade results with ease. This powerhouse features a direct-drive 1,750 RPM motor, delivering consistent power for all your sharpening tasks. Robust steel tool rests, including a grooved left-side rest specifically designed for drill bit sharpening, provide a secure and stable platform. Rubber feet ensure smooth and controlled operation. Adjustable shatter-resistant plastic eye shields safeguard your eyes, while an integrated light illuminates the grinding wheels and tool rests. Includes tool rests, eye shields, a diamond wheel dressing tool and 60-grit and 120-grit white aluminum oxide grinding wheels

KingCanada.com

Uninterrupted power during emergencies

The pinnacle of reliability, versatility and innovation, the King Canada 11000W Tri-fuel Inverter Generator (KCG-11000I-TF) embodies leading-edge technology. With the ability to run on propane, natural gas or gasoline, it ensures uninterrupted power during emergencies or outdoor adventures. Its advanced inverter technology delivers clean, stable sine wave power for voltage-sensitive electronics, making it ideal for homes, businesses and recreational use. The KCG-11000i-TF boasts an 18 HP, 4-stroke engine, robust design, electric and recoil starting, eco-friendly operation, versatile outputs and user-friendly controls for seamless operation.

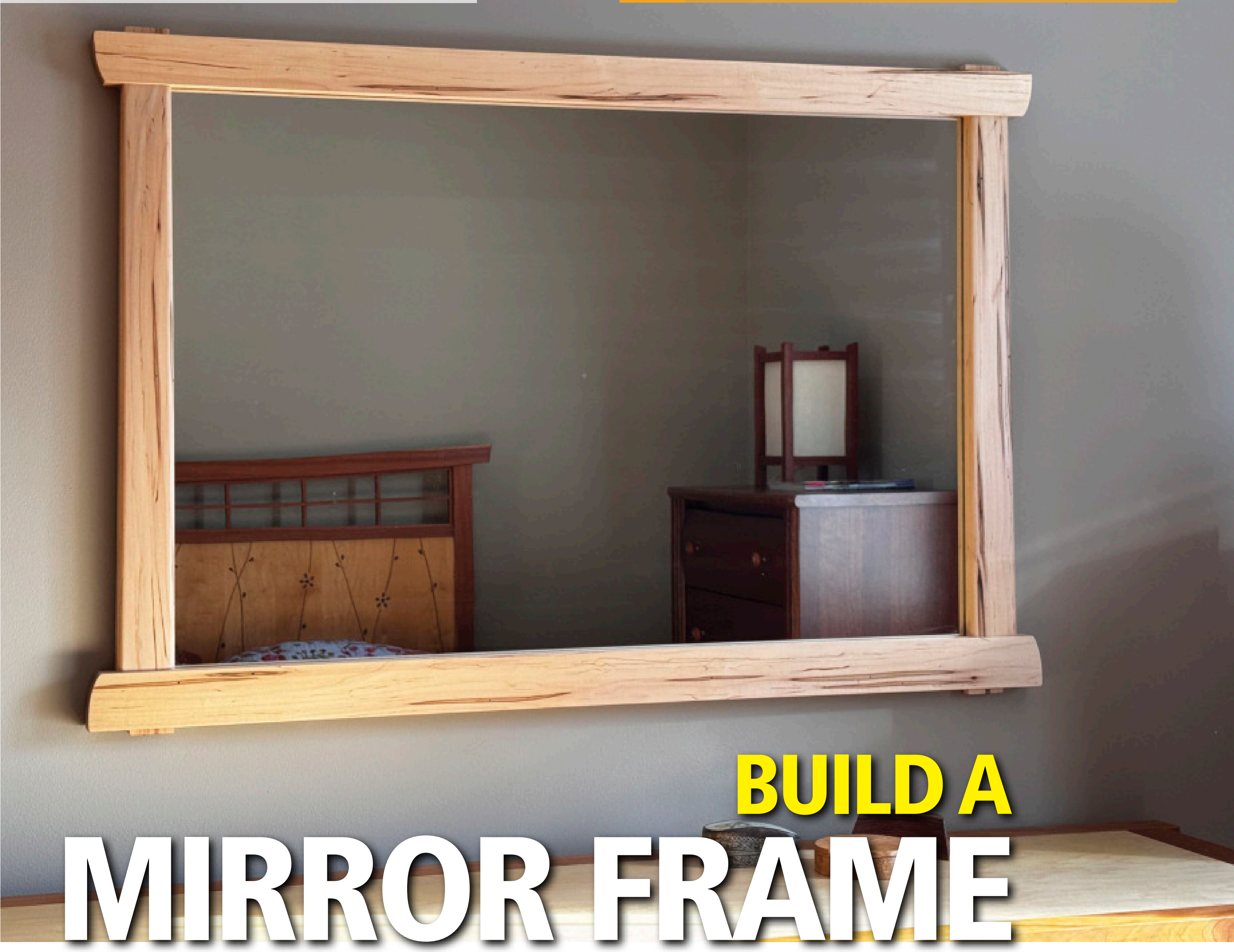
KingCanada.com

The reliable workhorse

The King Canada 8 Gallon Horizontal Air Compressor (8478) is a reliable workhorse. Powered by a 120V 2HP motor, the single-stage oil-lubricated pump provides 5.0 CFM at 40 PSI and 4.0 CFM at 90 PSI. Achieving a maximum pressure of 150 PSI, this compressor ensures optimal performance for a range of pneumatic tools. The 8-gallon tank stores a sufficient air reserve, minimizing pump cycling and maximizing work time. Equipped with an ASME safety valve for added peace of mind, this compressor also features a 1/4" universal "one-touch" quick connect coupler for easy tool attachment. Portability is enhanced by 6" flat-free solid wheels and a large handle. If you're seeking a high-value air compressor for a small- to medium-sized shop, the King Canada #8478 is an excellent choice.

KingCanada.com

INFO: DIFFICULTY – **2/5,** LENGTH/TIME – **2/5,** COST – **2/5**



BUILD A MIRROR FRAME

Simple half-lap joints create a classic, customizable design.

BY ROB BROWN

Photos by Rob Brown

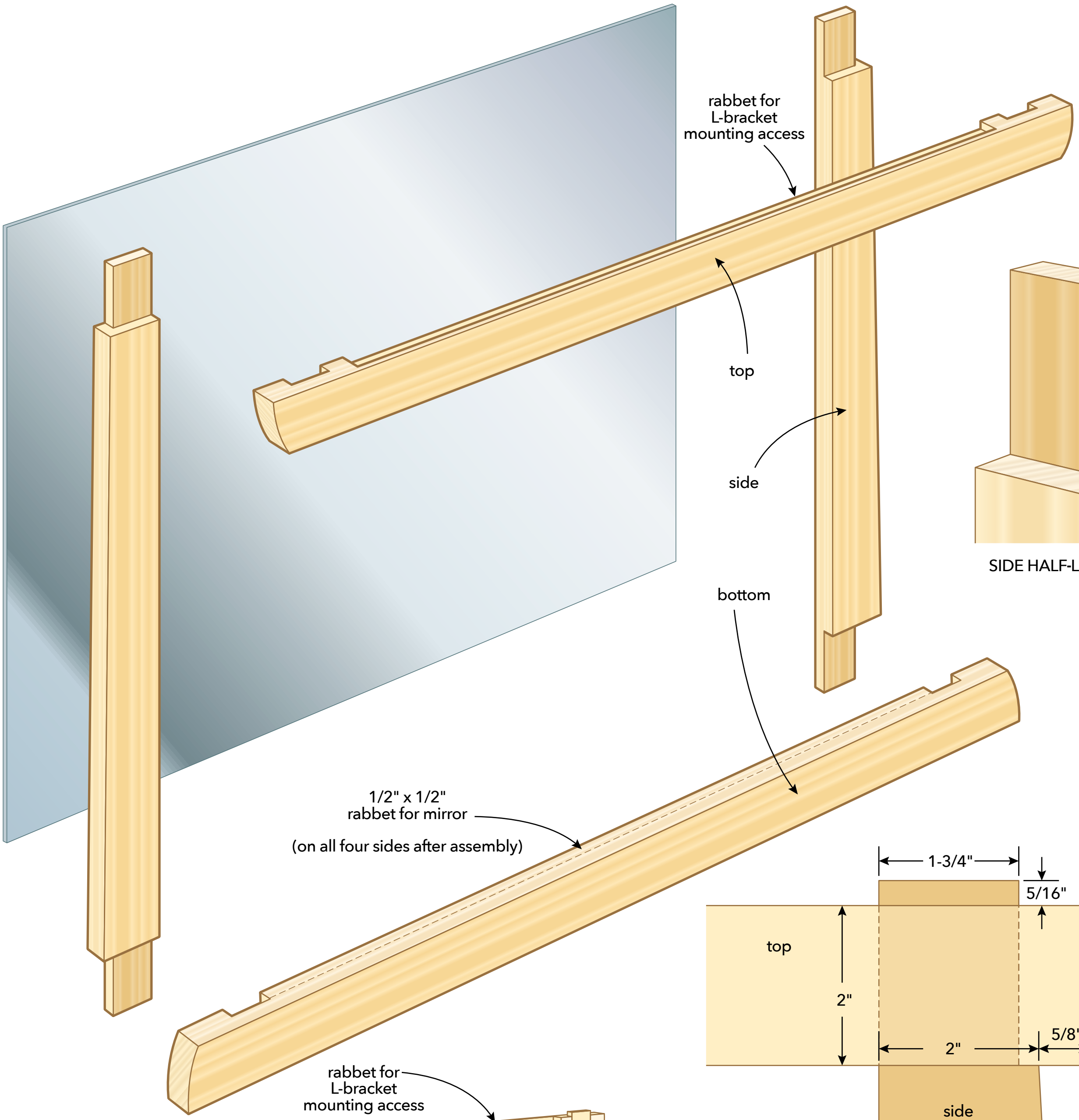
A mirror frame is a quick and easy project that can be customized to the décor in any room. This frame will hang above a six-drawer dresser in a bedroom, so it had to be oriented horizontally, but this design could be adjusted to hang vertically or even be made square.

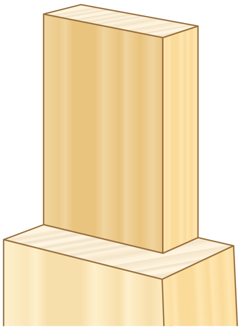
The frame was sized for a 24" × 36" piece of mirror I already had. Typically, it would be easier to build the frame first, with the general size of the mirror you wanted in mind, then order the mirror to whatever exact size you needed.

Grain selection

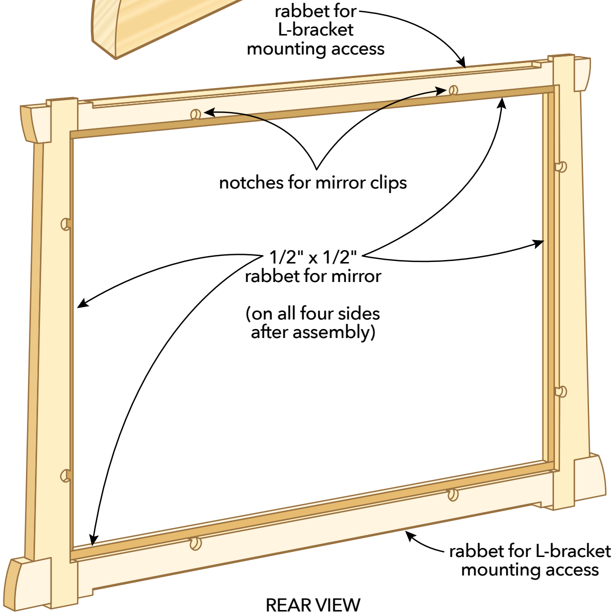
Grain selection is always important, but when there are only four parts to a project grain orientation is also fairly easy to keep track of. I started off with a 5/4 board of wormy maple about 6" wide and 8' long, which gave me about 1" extra width and about 24" extra length than I needed. This allowed me to adjust how I cut the four workpieces from the board to give me the best grain orientation and colour. Since I was also dealing with wormy maple, the holes and colour streaks had to be accounted for and spread across the mirror frame somewhat evenly.

I marked out where the cuts needed to be made and used a combination of bandsaw, hand saw, mitre saw and table saw to break out the pieces. At this point, flatten a face, square an edge, plane them all to a thickness of 1-1/8", rip them to width and cut them to length. The sides will get tapered later, so just leave their width at 2-1/4" for now.

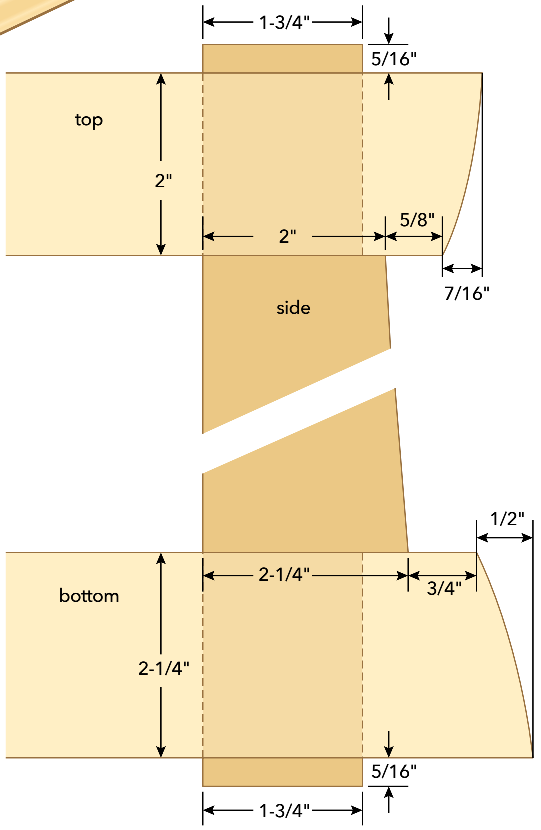

rabbet for
L-bracket
mounting access
top
side
bottom
1/2" x 1/2"
rabbet for mirror
(on all four sides after assembly)



SIDE HALF-LAP DETAIL


rabbet for
L-bracket
mounting access
notches for mirror clips
1/2" x 1/2"
rabbet for mirror
(on all four sides
after assembly)
rabbet for L-bracket
mounting access

REAR VIEW


1-3/4"
5/16"
top
2"
2"
5/8"
7/16"
side
1/2"
bottom
2-1/4"
3/4"
2-1/4"
5/16"
1-3/4"

JOINERY DETAILS

Materials List

Part	Qty	T	W	L	Material
Top	1	1-1/8	2	41-1/8	Maple
Bottom	1	1-1/8	2-1/4	41-7/8	Maple
Sides	2	1	2-1/4	28-1/8	Maple

Hardware List

Name	Qty	Size	Details	Supplier
Mirror	1	24" × 36" × 3mm		Misc
Plastic Retaining Clips	6	Flush	Item #00S0700	Lee Valley
Screws	6	#4 × 1/2"		Misc
L-Brackets	4	3/4" × 3/4"		Misc

Corner joints

The corners get secured with fairly simple, yet strong, half-lap joints. The mirror I salvaged was surprisingly heavy, so I didn't want to skimp on strength. Having said that, half-lap joints are easy to machine and can add some flair to an otherwise simple design.

Set a dado set to cut about half the thickness of the material. Even though the top and bottom are different lengths, the joints on both the left and right sides of these two pieces will be the same distance from each other. To keep things simple, I clamped the top and bottom together, laid out the location of the joints and cut the joints with the two parts clamped together. This ensures the joints are an equal distance apart.

I used the mitre gauge to guide the top and bottom across the blade while the rip fence set the location of the half-lap. Machine the half-lap 1-3/4" wide, even though the mating side pieces are wider. We will machine the sides to a narrower width so they fit into this half-lap joint later.

Grain Graphics – The grain and colour of each workpiece is often important, and this situation is no different. At least there are only four pieces to keep track of, which makes things easier. Brown positioned the dark streaks for the best balance overall.

Matching Half-Laps – Here, Brown clamped together the top and bottom rail so the half-lap joints would be the same distance apart, even though the overall lengths of the two rails are different.

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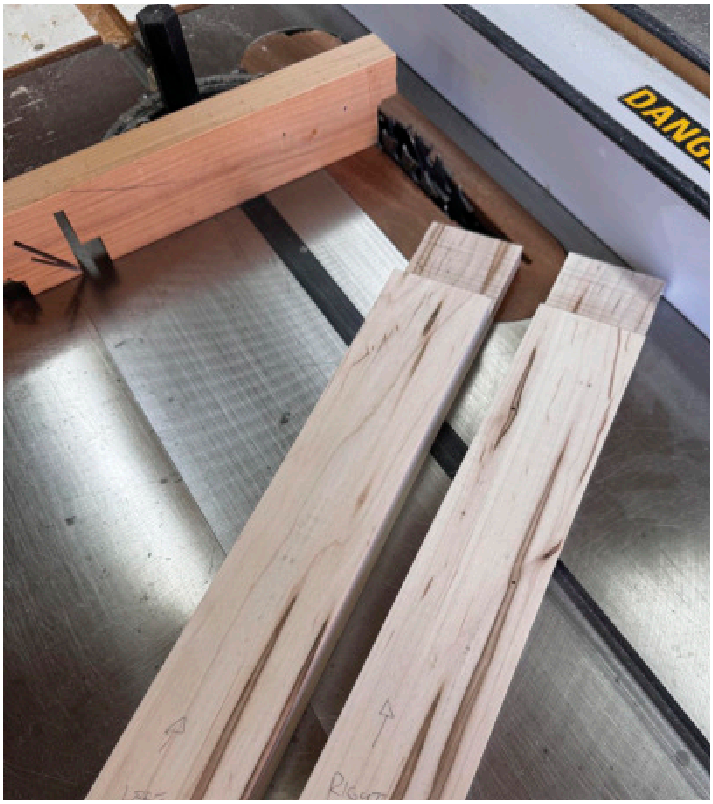
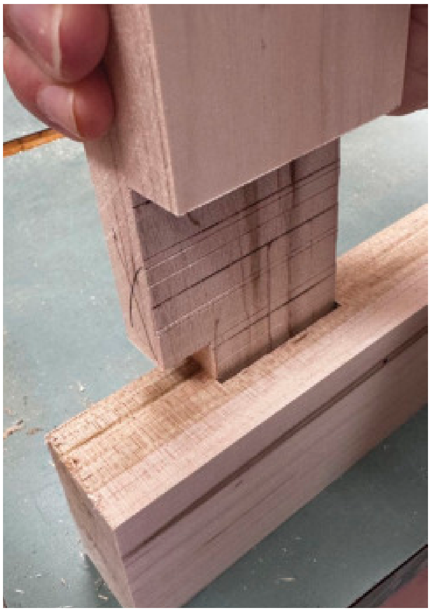


Mating Half-Laps – The mating half-lap joints are now cut into the sides. Notice the names of the parts on the faces of each part, which will help keep track of the different parts.

Machining the mating half-lap joints in the sides is next. Lay out where the cuts need to be made. Keep in mind, the top joint is 1/4" closer to the end of each side because the top rail is 1/4" narrower than the bottom rail.

Again, use the mitre gauge to guide the workpiece and the rip fence to determine location. Be sure to adjust the height of the blade to ensure the faces of the workpieces are flush with each other once the joint is complete.

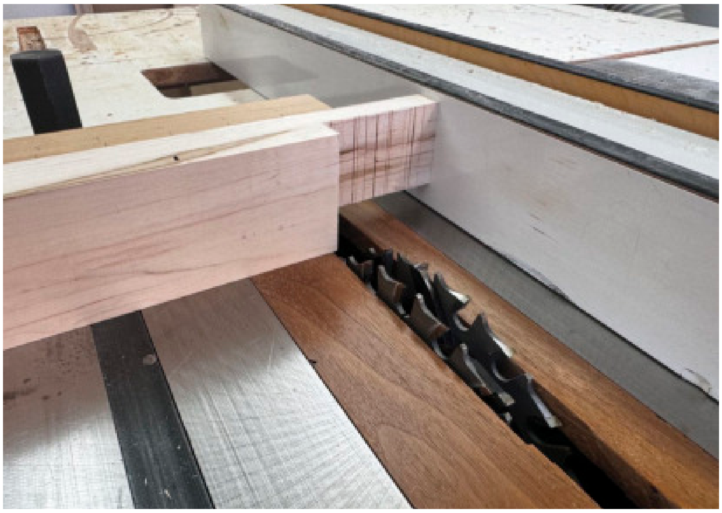


Check for Size – Dial in the width of the half-lap portion of the joints that are at the ends of the side pieces, then check the fit against the half-lap joints in the top and bottom rails.

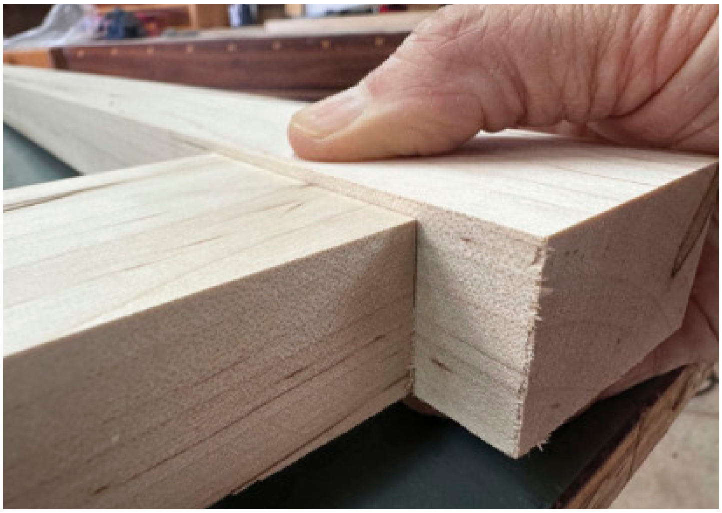
At this point, the joints will not fit together because the sides are too wide to fit into the 1-3/4" wide half-lap joint. To take care of this, notch the outer sides of the half-lap joint so the ends of the sides mate nicely with the joints in the top and bottom. Do this by rotating the sides so they're on their edge. Using the mitre gauge to guide the parts and the rip fence for location, run the parts across the blade. You'll have to adjust the height of the blade to leave you with a perfect fit. It's also a good idea to fit each individual joint to its proper mate, as these half-lap joints may vary slightly in their dimensions. Mark the joints of the workpieces so you know how they go back together during assembly.

Dress the sides

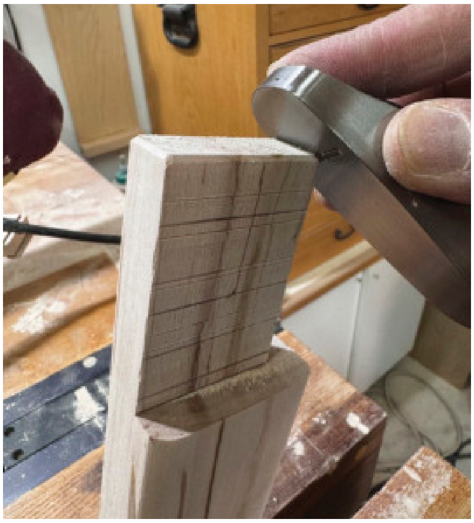
You can opt to keep the sides the same thickness as the top and bottom, but I prefer the look of them being thinner by about 1/8". With the joinery complete, pass the sides through the thickness planer with their outer face up until you like the size of the reveal between the sides and top / bottom.



Final Fit – With the height of the dado blade set, machine the four half-lap joints in the sides, with the workpieces on their edge.



Order of Operations – Although it's possible to dress the sides thinner than the top and bottom rails before machining the half-lap joints, Brown finds it easier to machine the joints, then dress the sides to final thickness and create a reveal between the sides and top / bottom rails.



Chamfer the Ends – The ends of the half-lap joints in the sides will be visible after assembly. Chamfer them and lightly sand the visible faces, even though they're very small.

Taper the sides

The sides taper by 1/4" in width as they rise upwards. Mark the top and bottom of each side, then use a taper jig on the table saw to bring the sides to their final size. Ensure the taper is on the outer edge of each side. This is the side that has the half-lap joints notched, so the taper won't affect the final fit of each corner joint.

Round over the sides

This step can also be skipped if you would rather have sides with straight edges. I prefer gently rounded edges on the sides, so I set up a large round over bit in my router table to my liking and made a pass on both edges of the sides. You could also use a hand plane to give you a gentle radius on both of these edges.

Shape the ends

The ends of all four of these parts need at least a bit of work before assembly. The top and bottom need the most attention. Mark a pleasing curve on their ends with a French curve. Use the bandsaw to take off most of the waste, then fair their edges with a sander. For consistency, it might be best to shape a pattern, then use it to mark the rest of the edges. The difference in thickness between the top and the bottom will mean you'll have to adjust the layout slightly.

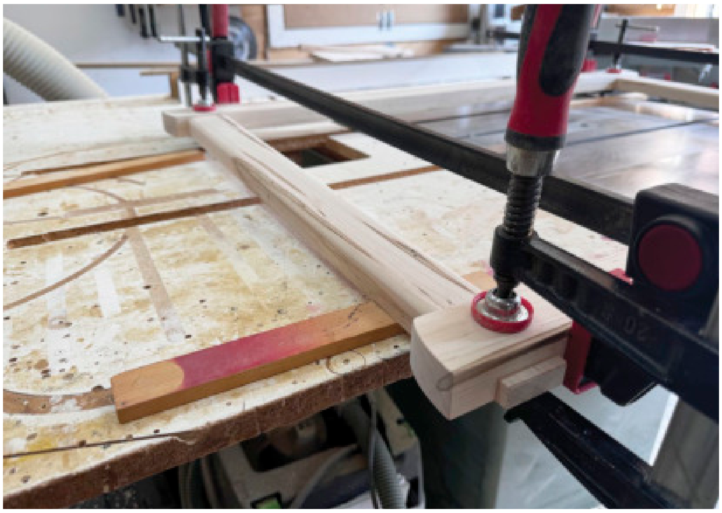
The distant 3/8" of each half-lap joint in each side will be seen. Sand the faces and edges of the lap joints, paying special attention to the end 3/8". Use a block plane to chamfer the corners. Check how each joint looks once everything is clamped together and make any necessary adjustments.

Sand and assemble

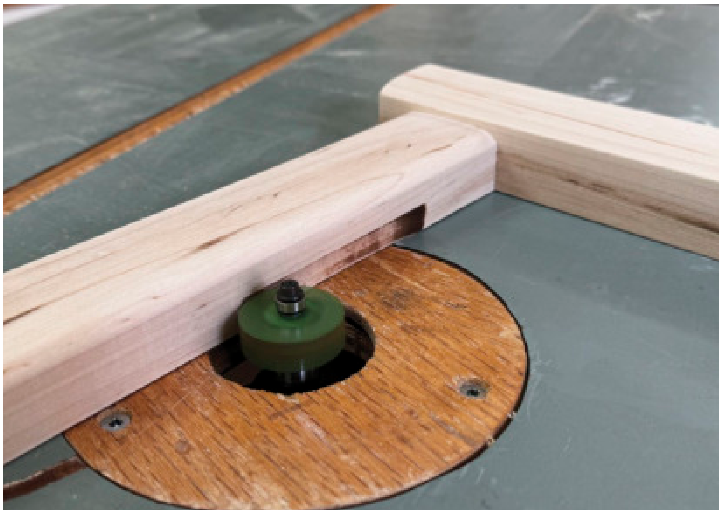
Sand the faces and edges of all the parts and prep for assembly. A dry run will give you the confidence needed to reach for the glue. Apply glue to the faces of each half-lap joint, making sure to stay away from the distant 3/8" of each half-lap joint on the sides. A pair of clamps bringing the top and bottom towards each other will help keep the gaps tight, while a clamp at each half-lap joint will bring the glue surfaces together nicely. Ensure everything is square, then let the assembly dry.

Rout for the mirror

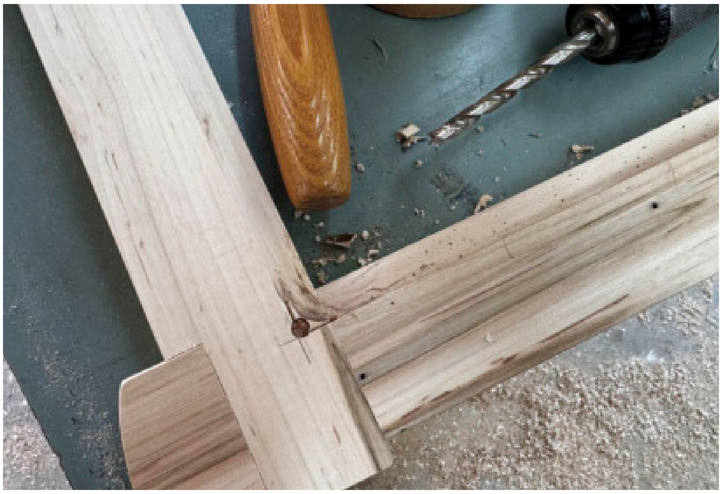
Clean up any dried bits of glue in the corners. Set up a rabbet bit in your router table that will cut a 1/2" rabbet in the inner edge of



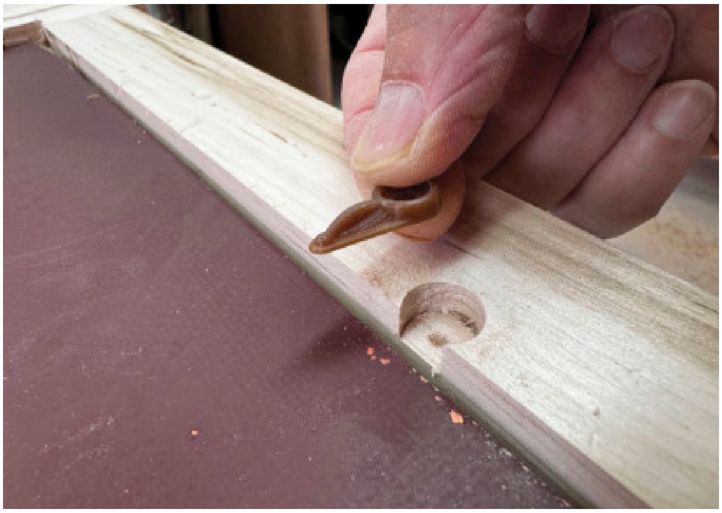
Bring It Together – Apply glue to the face grain of all the half-lap joints and bring them all together. Once longer clamps bring the edges of the joints together, smaller clamps can bring the faces of the joints together.



Rout and Rabbet – Once the frame was glued up, Brown used a rabbet bit in his router table to create the rabbet to accept the mirror. Each pass was shallow to reduce tear-out.



The Easy Route – Rather than chisel out all the waste in the corners, Brown used a drill bit to remove some of the waste from the corner, then a chisel to remove the rest. This approach is much easier.



Mirror Clips – A few holes bored in the rear face of the frame will accept the plastic retaining clips. Bore a small pilot hole in the centre of the large hole to accept a #4 screw.

the assembly. I machined it 1/2" high, also. The first pass should be quite light to reduce the risk of chipping. Instead of machining the second pass to full depth, I made additional light passes to slowly reach the full depth after about four passes. Routers work best when removing small amounts of material at a time.

The corners will have to be dealt with in order to allow the mirror to sit into the rabbet. There's nothing wrong with using a sharp chisel and mallet to square up each corner, but I prefer using a 1/4" diameter brad point bit to remove the material in the corner, then cleaning up the small amount of waste with a chisel and mallet. Just be sure not to drill too deep or you'll bore through the face of the frame.

Drill for mirror clips

You can attach the mirror with silicon, but that always seems so final to me. A broken mirror can't easily be replaced if silicon was used. Plastic retaining clips are just one way of holding a piece of mirror in place. Drill 1/2" diameter holes in the rear face of the mirror located so they slightly overlap the edge of the rabbet. The depth of these holes will have to be adjusted to work with the thickness of mirror you have and the size of clip you purchased. A pilot hole in the centre of this hole will allow you to drive a small screw home to hold the clip in place without cracking the frame.

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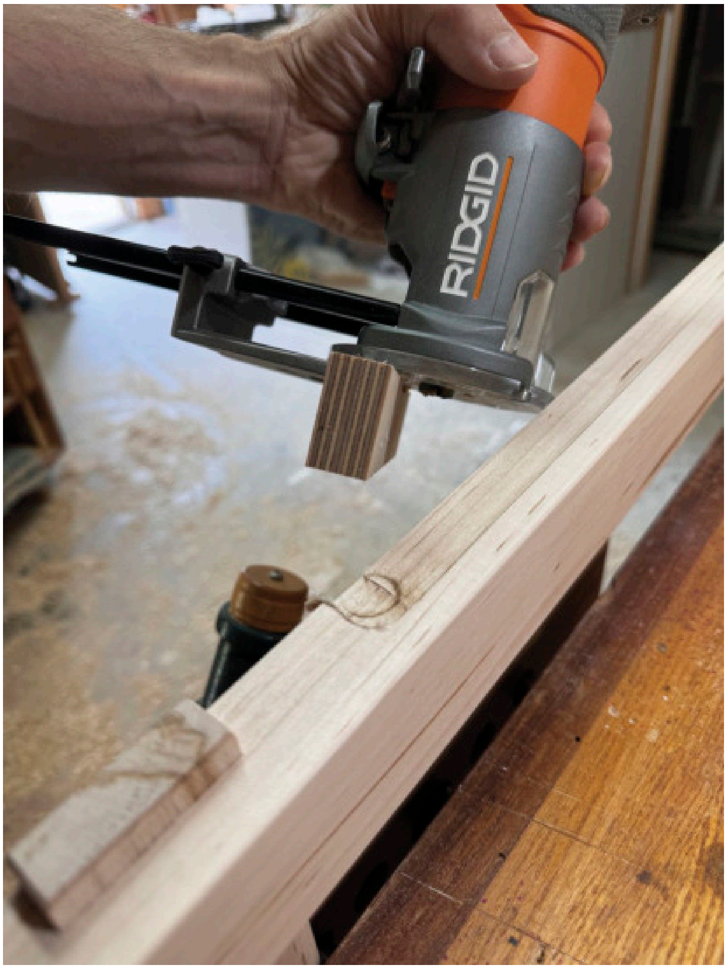
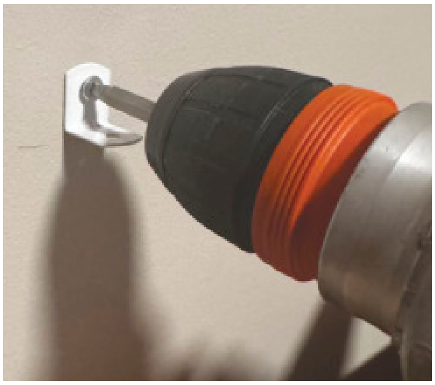


Hide the Hardware – Brown used a trim router, equipped with a 1/2" diameter straight router bit, to machine a shallow rabbet along the upper and lower edges of the frame. This rabbet will allow you to use standard L-brackets to install the frame on the wall, yet have the L-brackets hidden from view.



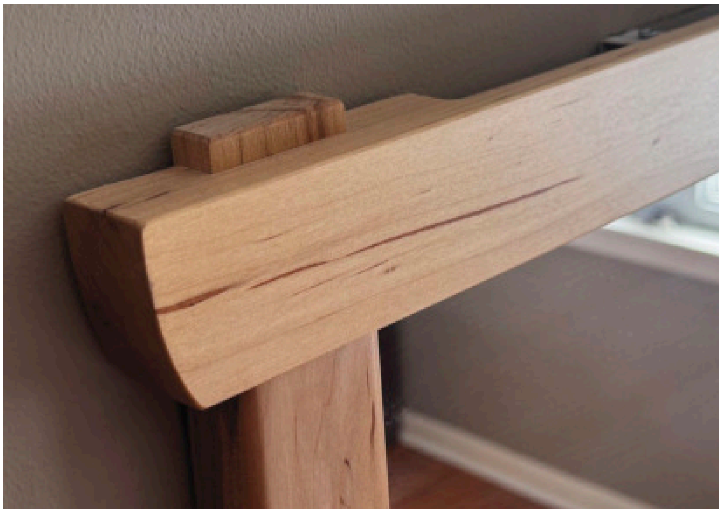
Invisible Hardware – The L-bracket that secures the lower frame rail gets installed in this orientation, and the mirror frame just sits on top of the protruding portion of the L-bracket. Drill a pilot hole and install a screw up into the frame. The L-bracket won't be visible.

Sand and finish

I gave the faces of the frame another once-over and ensured all the edges and corners were eased. I sprayed on three coats of polyurethane, sanding between coats, but just about any finish will do, as this frame won't get a lot of abuse during its lifetime.

Hang it high

There are many approaches to hanging a mirror frame. I'll describe the method I used. Since the lower and upper edges of the frame won't be seen, I decided to machine a shallow rabbet to house and hide L-brackets. The L-brackets can be screwed into studs, then the mirror frame can be screwed to the L-brackets. Just



All Done – With the four main joints constructed, and the finish applied, the rabbets in the upper and lower rails will accept the L-brackets on the wall and you can screw the frame in place.

ensure the L-brackets get screwed to the wall so the portion of the L-bracket that's against the wall is behind the mirror frame. This approach will leave you with no visible fasteners, unless you bend down and look closely at the lower edge of the frame or get on a ladder to look at the upper edge.

I machined the rabbets with a trim router and edge guide, using a few passes to remove the material. The rabbet on the lower edge of the frame is about 3/16" deep. In order to give me a bit more flexibility during installation, and to ensure the L-brackets would be covered, I machined the top rabbet 5/16" deep. This means I can leave about 1/16" more between the upper and lower L-brackets when I install them on the wall, giving me that extra distance to work with, yet the top L-brackets will still not be visible. The installed frame rests on the lower L-brackets, while the upper L-brackets just keep the frame from falling over.

With the L-brackets fixed to the wall, temporarily install the frame and test for fit. Once it's fitting nicely, remove it, install the mirror with the glass clips, then reinstall the frame on the wall. Finally, stand back, take a look at the person in the mirror and congratulate them on a job well done.

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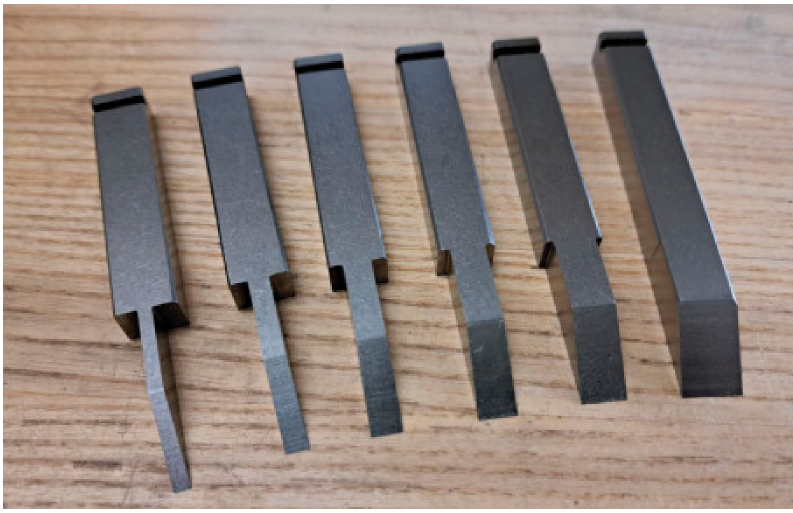
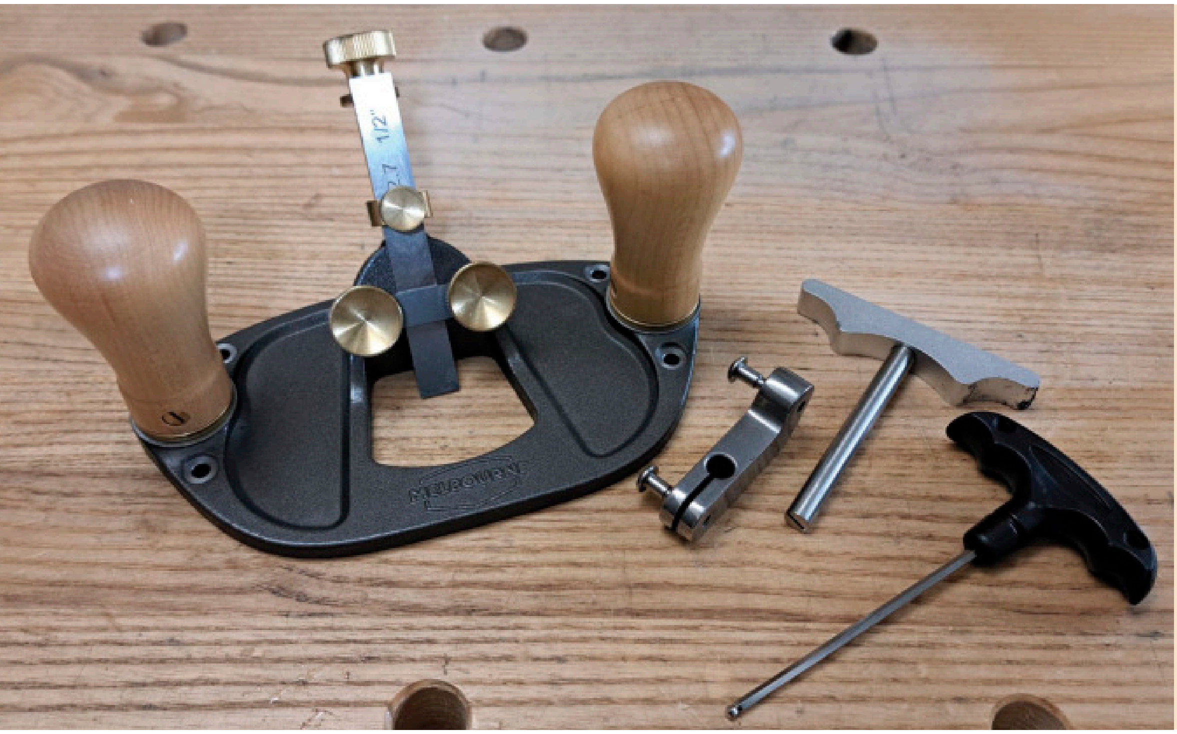


Blade Options – Although the plane comes with one 1/2″ wide blade, you can get a set of either metric or Imperial blades to suit your needs.



Melbourne Tool Company Large Router Plane

Ideal tool for cleaning up grooves, rabbets and dadoes

Melbourne Tool Company MTC-11084 Large Router Plane

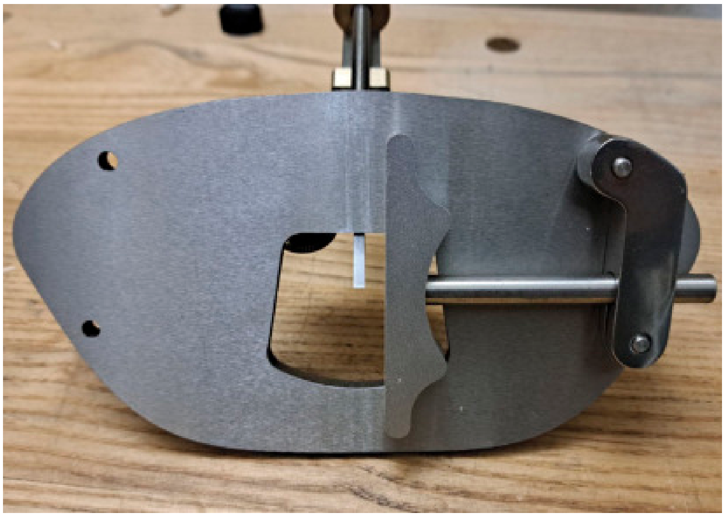
BY CARL DUGUAY

A router plane is a specialty hand tool designed to flatten to a precise depth the bottom of grooves, rabbets and dadoes cut on a table saw or by a router. It makes quick work of flattening hinge mortises, tenon cheeks, mortises for inlays and the like.

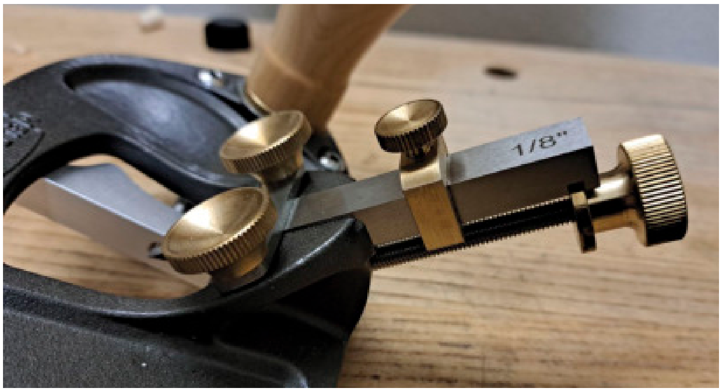
The MTC-11084, from Melbourne Tool Company (MTC), is a closed-throat, bevel-down, router plane that has a large 100mm × 183mm (4" × 7") sole with robust 44.5mm × 76mm (1-3/4" × 3") maple handles. It weighs in at a substantial 1150g (2.5 lbs). The plane comes with a 12.7mm (1/2") straight blade and a 12.7mm × 79.4mm (1/2" × 3-1/8") aluminum fence that provides 54mm (2-1/8") of travel. Optional metric and imperial blades are available separately or in sets. You can install the fence on either side of the plane and also use the fence-mounting holes to attach a sub-base (user made) when working on delicate workpieces.

The plane body is made of steel and has a 50° bed angle. The knurled knobs are brass and the blades are made from a single billet of M2 high-speed steel. A tungsten-molybdenum alloy, M2 is the industry standard because it has good wear and abrasion resistance, is easy to sharpen and has a Rockwell hardness between

Photos by Carl Duguay



Adjustable Fence – The fence can be installed on either side of the blade, giving the user a lot of flexibility.



Blade Depth – The blade adjustment knob precisely sets the depth of the blade.

Staying Put – Dual clamping knobs ensure the blade stays exactly where you set it.

60 and 65 that's "tough enough." The blades are ground to a 30° bevel and can be put straight to use (unless, of course, you're a perfectionist).

To do its job well the sole needs to be perfectly flat, and the MTC-11084 is spot-on in this regard. As well, the blade needs to sit perfectly flat in relation to the sole. In my tests the bevel edge of all the blades aligned perfectly with the sole. I really like the design of these blades. Unlike other router plane blades, which have the end of the blade oriented 90° to the arm, these MTC blades are easily sharpened.

Adjusting the cutting depth of the blade is straightforward. There's a locking depth stop you use to set your target depth-of-cut. You then use the depth adjustment knob to set the cutting depth, working in small incremental steps to reach the target depth. Two clamping knobs hold the blade firmly in place once you've established your cutting depth – each time you adjust the cutting depth you need to loosen these knobs. The depth adjustment knob is fixed to an M6 × 1mm threaded rod. One full turn of the knob advances the blade 1mm. Because of the 50° bed angle this translates to a 0.77mm (.03") depth-of-cut – near enough to 1/32".

The large sole and closed throat offer a lot of support when you're working on narrow edges without sacrificing visibility. I like the large upright wooden knobs more than canted handles as they're comfortable to hold and provide excellent manoeuverability.

The machining on this router plane is excellent and the adjustment knobs easy to manipulate. Setting the cut depth is about as easy as it gets. I'm hoping that the MTC decides to add a few spear-point blades to their inventory. I find them exceptionally handy for getting into tight corners. This isn't a plane that I use as often as my bench planes, but I appreciate having it when I need to fine-tune dadoes, grooves and other recesses.

Melbourne Tool Company Large Router Plane
MSRP: $199 (includes fence and 1/2" blade);
$147.46 (set of five metric blades); $159 (set of five Imperial blades)
Website: MelbourneTool.com
Tester: Carl Duguay

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DOUBLE-SIDED TAPE
A GRIPPING TALE

Photo by Mark Salusbury (Photo Lead by Rob Brown)

The perfect no-mess, firm, yet temporary bond for a wide range of workshop applications.

BY MARK SALUSBURY

I'm a big fan of using adhesive tape in the shop. There's a type for every need, and double-sided tape is oh-so-useful. Need to stick a turning blank to a face plate on your lathe? Or bond a blank to a template for shaping with a router or bandsaw? Or stick a pattern to a blank for scroll-sawing? Or maybe you want to bond a leg blank to a jig for tapering on your table saw? Double-sided tape might be your answer.

For all these applications, we need a tape that's user-friendly, thin, stable, has firm tack, can be removed easily leaving no residue, and raises no grain. Not asking too much, are we?

Is there a difference?

What's the difference between double-sided tape sold at office supply or art stores, a woodworking tool store or an industrial fastener supplier? In practical terms, not as much as I imagined. If the work surfaces being bonded are clean and dry, and we use enough tape to hold firmly, they all work quite well.

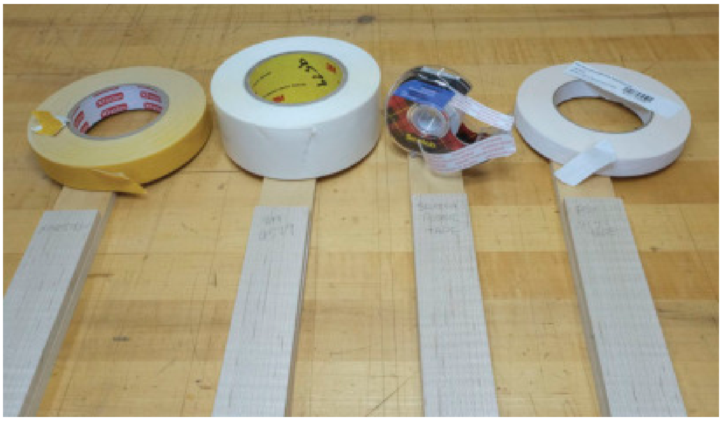
To answer my question, I examined "woodworking tapes" from PSI and XFasten, an "industrial tape" from 3M, and an "office/arts tape" by Scotch. I compared their width and length, film thickness and material, stickiness and bond ability, ease of application and lastly, ease of removal and residue, all important factors to woodworkers.

All but one came in rolls of 108 ft. (36 yds.) with widths of either 3/4" or 1", though 3M 9579 is available in widths from 1/2" to 2" and even wider. Scotch Poster Tape only comes in a dispenser roll of 3/4" × 4.16 yds.

The adhesive film layer thickness, material and adhesive vary from brand to brand. PSI Woodworking Tape is a sticky (my term for comparison here) opaque paper with a thickness of 0.15mm (my measure by digital Vernier gauge) with a slick crepe paper liner. XFasten has a gooey-tacky (again, my description) adhesive on an opaque woven gauze and is the thickest at 0.25mm, backed by a plasticized paper liner. The industrial 3M 9579 tape employs a "quick stick" (3M's term) adhesive on an opaque polyethylene film measuring 0.18mm by my gauge, lined by plasticized craft paper. Lastly, the Scotch Poster Tape, a tad less sticky than the others, uses a translucent plastic film of 0.12mm thickness overall, lined by a durable plasticized paper.

All of the tapes I sampled were very user-friendly, peeled off the roll readily, cut crisply (XFasten was a tad more resistive because of its base layer), each tearing to rough length with little effort. Peeling the backer off the film went easily with each tape, though the thin, clear film and thicker backer of the Scotch Poster Tape required a bit more concentration.

Each of the tapes offer excellent adhesion. To test this I bonded a 1-7/8" × 10" strip of freshly planed maple to a strip of freshly cut Baltic birch plywood, covering each joint generously just as I'd bond a blank to a template or jig for shaping. I then pressed each strip down equally firmly and left them a while to see if time would reveal any ugly surprises when I separated the parts. After three hours, I pried the maple from the plywood starting at one end using only a 2" chisel tip, merely for leverage. Each took moderate effort to start, then offered some resistance when I peeled the maple away from the plywood, but each parted cleanly. The Scotch product showed only slightly less adhesion, as might be expected given its intended purpose.



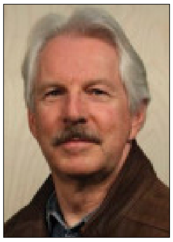
Testing, Testing – Part of Salusbury's testing included bonding strips of maple solid to plywood with different types of double-sided tape to see how they performed.

As for residue and/or grain lifting, none showed any trace of these downsides. In each case, because the planed hardwood had a smoother surface than the sanded plywood, the adhesive remained stuck to the maple but peeled away cleanly with surprisingly little effort.

Pricing remains the biggest difference among this selection of samples with the 3M 9579 and PSI examples selling for approximately $20 per 36 yd. roll ($0.56 per yd.); the Scotch Poster Tape at $12.49 per 4.16 yd. roll ($3 per yd.); and finally XFasten Woodworkers Tape in a three-roll pack (36 yds. per roll, totalling 108 yds.) at under $30 per package ($0.28 per yd.).

All said, for a firm, reliable, user-friendly bond for a host of wood shop applications, my first choices would be 3M 9579 and PSI Woodworking Tape. For value per yard the XFasten Woodworkers Tape gets the nod while the Scotch Poster Tape punches above its weight in low-impact applications and may be the most easily accessed in a pinch.

In summary, with clean, smooth surfaces and sufficient coverage to bond the parts, but not get cut away during the shaping operation, double-sided tape may allow you to replace hot-melt glue or obstructive clamping very safely. It's a great tool to add to your tricks bag.



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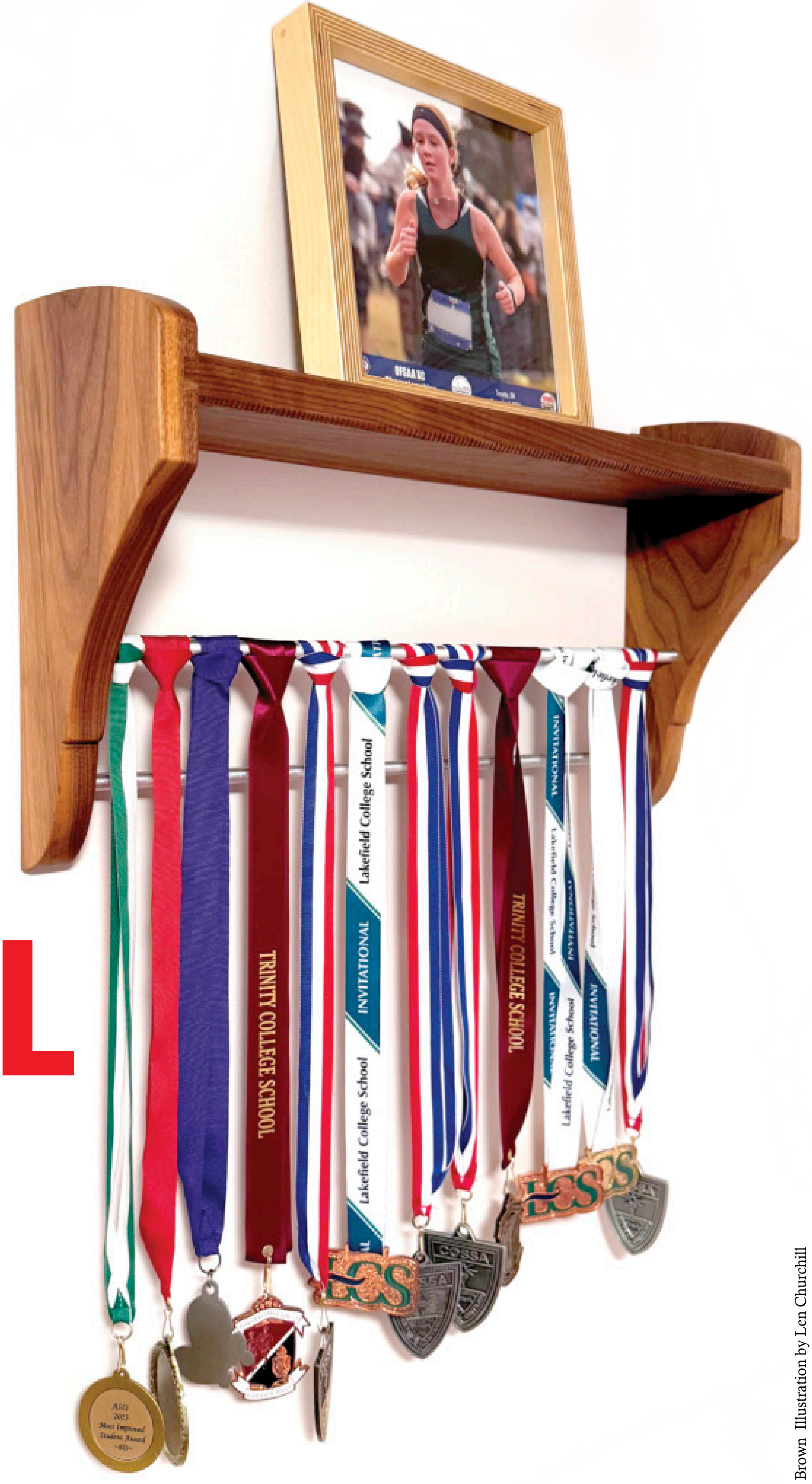


MAKE A MEDAL RACK

If someone you love has a medal collection they're proud of, they'll surely love this special display rack.

Photos by Rob Brown Illustration by Len Churchill

BY ROB BROWN

My daughter, who plays soccer and takes part in cross-country running and Nordic ski races, has started to build up a small collection of participation and placing medals. She's proud of her accomplishments, but the medals were sitting in a basket in her closet, out of sight. I did what any proud dad would do and built a medal rack so she could display her collection.

Keeping it simple

I didn't want an overly ornate rack to take away from the medals, so I opted for a fairly simple design that would still showcase the medals. Two sides on either end of a shelf, along with a couple of metal rods to hang the medals from, was all that was needed. She liked the rich colour of black walnut, but just about any species will work.

The rods

Before making any sawdust, I needed to decide what material the rods would be made of. Lengths of wooden dowel rod would be easy to machine, but I was worried about strength. I didn't want to use a 1" diameter wooden dowel, as that's not the refined look I was after. On the other hand, a 3/8" diameter wooden dowel rod would flex too much. Thin dowel rod (around 3/8" or less) tends to warp and may look unsightly as time goes on.

My solution was to go with an aluminum dowel rod. It contrasts nicely with the black walnut and provides a sleek look to this project. I bought a 48" length before I started this project, so I knew what size holes to bore in the inner faces of the two sides. You could also go with a different material for the metal rod, possibly a narrow diameter copper pipe.

Break out and lay out

Break out the three parts and dress them to final thickness. For now, I kept the two sides in one long blank because that was going to make machining the joints a bit easier. Even though the two sides are only 12" long each, I cut this blank about 4" longer than I needed. Straighten one long edge of each part, then rip them to final width.

A butt joint, reinforced by dowels, would be strong enough for this project, as it's never going to take much stress or abuse, but I liked the idea of having a visible joint. A sliding dovetail was what I went for. It's a bit more involved to create, but it's attractive and will provide more than enough strength.

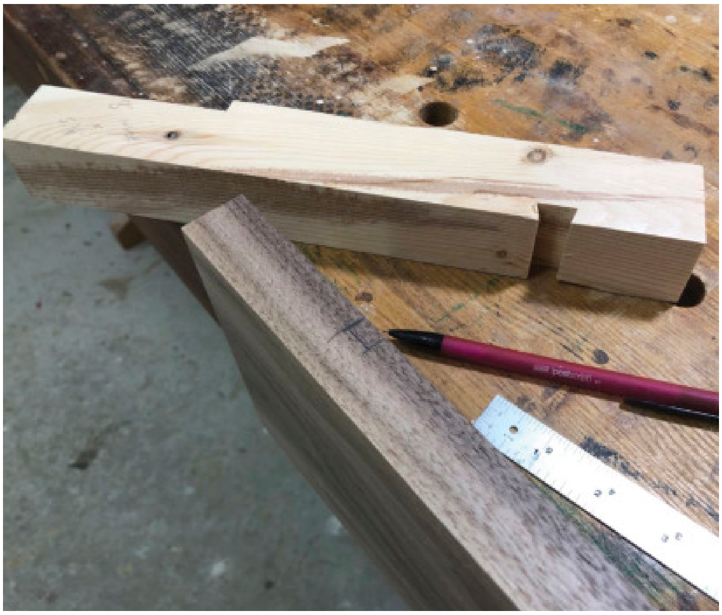
Lay out the two sides on the blank. Mark the overall length of the two parts and the location of the shelf-to-side joints. The finished rack will have the sides extend above the 7/8" thick shelf by 1-1/2", so make sure to centre the joint 1-15/16" away (1-1/2" + 7/16") from the upper ends of each side.

Sliding dovetail grooves

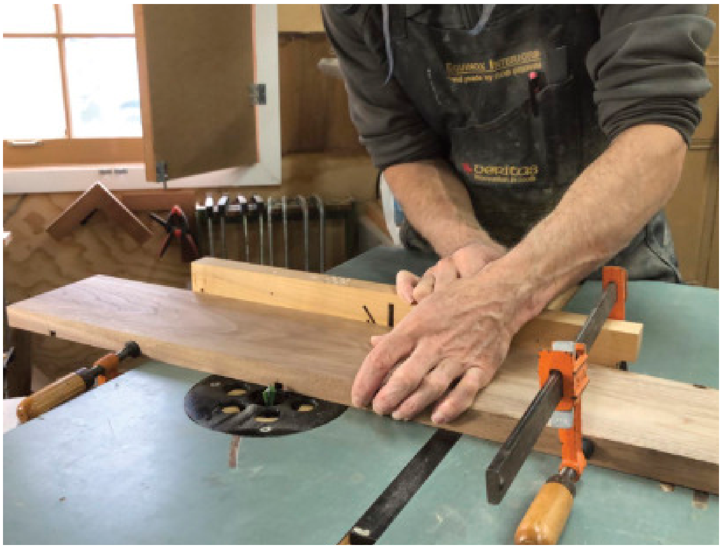
It's always best to machine the groove of a sliding dovetail joint first, then machine the mating dovetail tenon to fit the groove.

A router and router bit work best when it removes only a small amount of material. For this joint, I used a dovetail router bit that was 5/8" wide at the widest point, and set it to cut 3/8" deep. That means the bit is being asked to remove all that material in one pass, as you can't set a dovetail bit to only cut half the finished depth. In order to make this cut safer and smoother, I wanted to remove some of the waste before routing the finished dovetail groove. I would do this by machining a dado on my table saw.

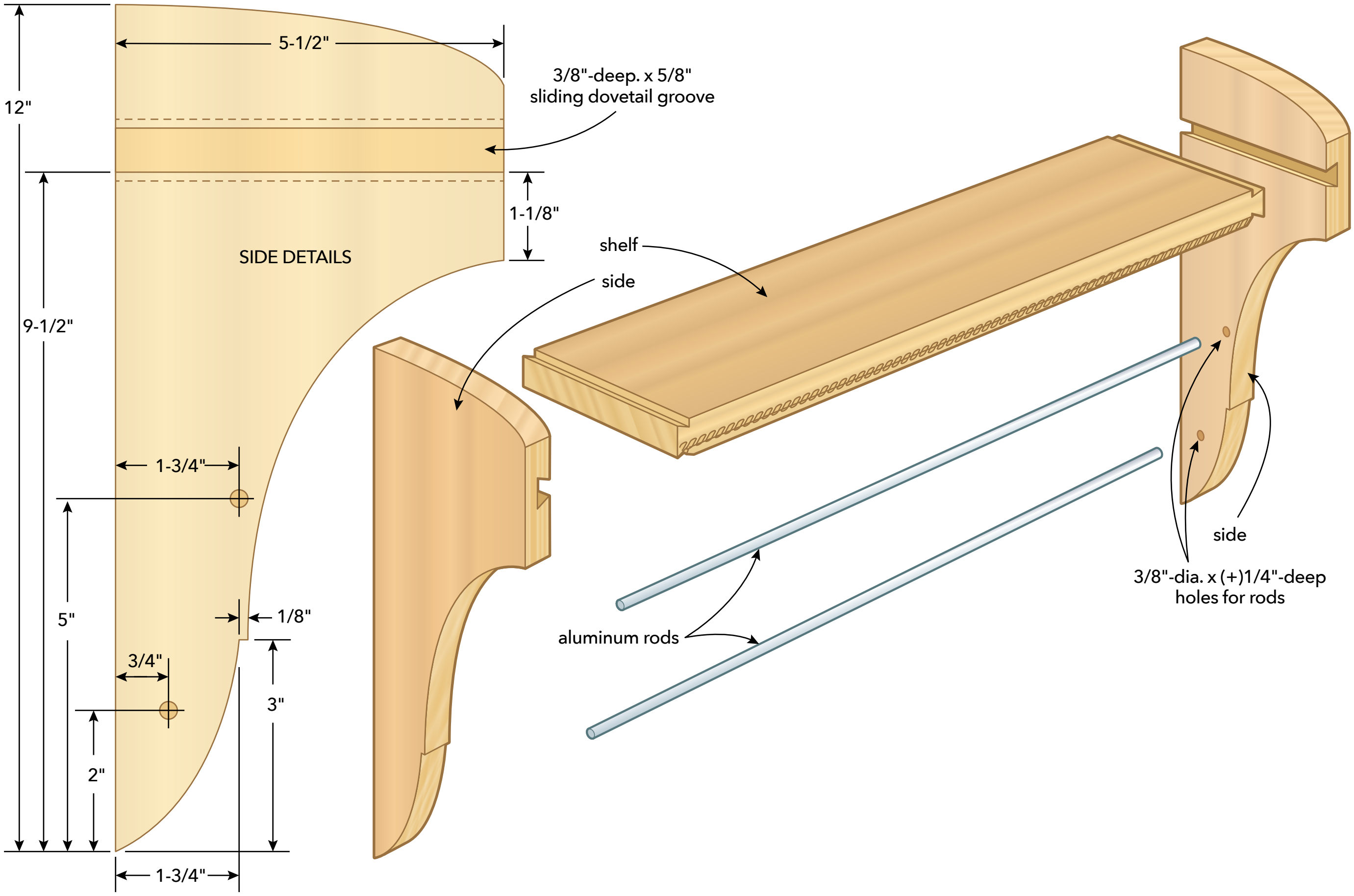
First, I needed to know the exact outer profile the dovetail bit would leave, so I didn't remove too much material. I set up the 5/8" router bit in my router table and raised it to cut a 3/8" deep dovetail groove. With a scrap workpiece clamped to my mitre gauge, I machined a dovetail groove into a piece of softwood. This gave me the exact locations of the sides of the dovetail groove. I could then transfer those surfaces to the workpiece and decide on the width and height of the dado I could machine into the workpieces to remove about half of the waste in each dovetail groove.



Check for Size – So you know how wide and deep to machine the dado, cut a sliding dovetail tenon into a piece of scrap softwood. The dado will just remove some of the waste so the process of routing the dovetail groove is safer and leaves a better cut.



Machine Dovetail Grooves – While the two sides are still in one blank, Brown clamps the blank to his mitre gauge and makes the two passes, making sure to keep even downward pressure on the workpiece during the passes.



Once the dadoes were machined into the sides, I could then carefully locate and clamp the side blank to my mitre gauge, make the first pass, then adjust the location of the blank and make the pass in the second side. Ensure even, downward pressure on the workpieces as you machine the dovetail grooves.

Sliding dovetail tenons

In theory, you can keep the bit set to the same height to machine the tenon portions of these sliding dovetail joints. I, however, find that since there are some very slight inconsistencies with the flatness of my router table, leaving the bit at the same height means the tenons end up slightly too long. You may not have this problem. You can set up your router table fence and check the depth by machining a practice tenon on the end of the workpiece, if the workpiece is longer than needed. Another approach is to use a piece scrap that's been machined to the exact same thickness as the shelf to set up the router table's fence.

When machining sliding dovetails on relatively narrow workpieces (say, less that 8" wide) I often clamp a piece of 1/4" thick

Even Support – Brown prefers to add a piece of 1/4" thick material over the throat area of the router, and adjust the height of the bit, to machine the sliding dovetail tenons. The piece of 1/4" thick material offers smooth and even support for the end of the workpiece to run over.

Materials List

Part	Qty	T	W	L	Material
Sides	2	7/8	5-1/2	12	Black Walnut
Shelf	1	7/8	5-1/2	20-7/8	Black Walnut

Hardware List

Name	Qty	Size	Supplier
Aluminum Rod	2	3/8" dia × 20-5/8" long	Misc
L-Brackets	2	3/4" × 3/4"	Misc

material on top of my router table's surface. This provides me with a smooth surface to guide the end of the workpiece past the rotating bit.

With the 1/4" board in place, I set up the fence so only a small portion of the dovetail bit protrudes from the face of the fence, then adjust the height. I first dial in the height of the bit, then start working on the location of the fence to give me a dovetail tenon that fits the mating dovetail groove. The main risk with machining sliding dovetail tenons is making them slightly too narrow and ending up with a joint that's loose. As long as your shelf blank is cut at least a few inches longer than needed, you can use the first dovetail tenon as practice and cut the tenon off if you machine it too small.

If this is your first time machining a sliding dovetail joint you can break out some extra scrap of the exact same thickness as the shelf to give you some material to dial in the position of the fence.

Square up one end of the shelf, then adjust the fence to sneak up on the final position, then machine the sliding dovetail tenon on one end of the shelf. Test fit the joint. You want a joint that doesn't slide together too easily, though you don't want the joint to be so tight you need a mallet to drive it home. If it's too loose, trim the dovetail tenon off and start again. When I've made a mistake on a critical workpiece, and can't cut the undersized tenon off, I've glued on a piece of veneer to one side of the dovetail tenon to give me a bit more material to re-machine.

Once you have the first one complete, it's time to cut the shelf to final length and machine the joint on the other end. This is where you only have one shot. Though, having said that, in this case it's not the end of the world if you have to trim about 1/2" off the length of the shelf to re-machine the joint. This just means your medal rack will be narrower than mine.

Shape the sides

Mark the shape of the sides on the two workpieces, making sure to keep the sliding dovetail joints the correct distance from the upper ends of the sides. I used a pencil and French curve to mark up one side, cut it to size, then traced the second side using the first. Sand the edges smooth.

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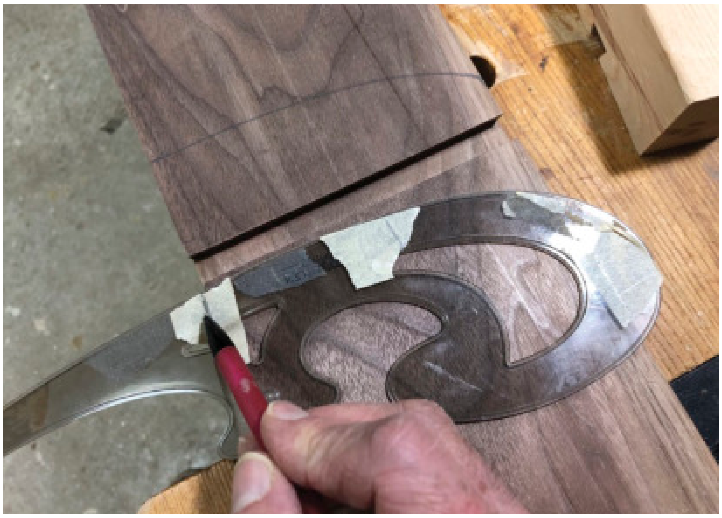
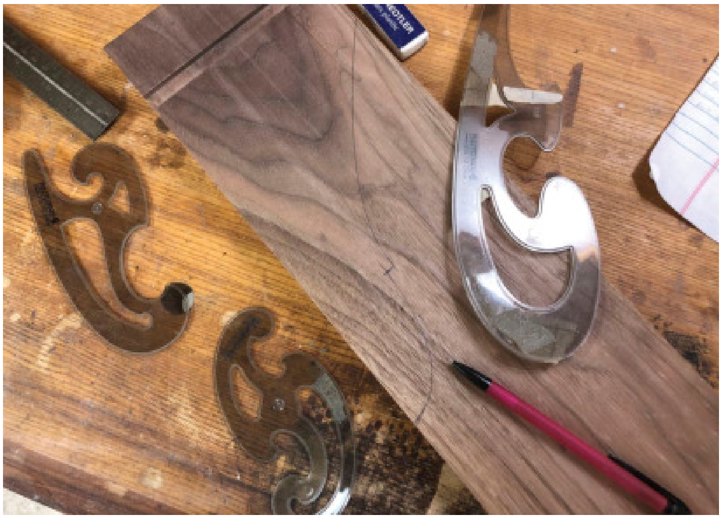


Lay Out the Curves – A French curve template will help you lay out even curves on the sides. Ensure the top of the side is an appropriate distance from the dovetail groove, though there's some flexibility here.



Leave Enough Room – The curved portion of the side that's below the dovetail groove should leave you with enough material to locate the medal hanging rods. Once one side has been shaped, trace it onto the other side so both parts are even.

Texture the shelf

This part can be skipped if you'd like, but I find it adds a bit of spice to this small project. I used a small, sharp, carving gouge to add a series of small notches to the lower front corner of the shelf. There are many other approaches to texturing you could add here. Because you've already put some time into creating the shelf, complete with two well- fitting sliding dovetail joints, it's probably smart to practice on some scrap before adding any texture to your project.

Work the rods

It's time to turn your attention to the hanging rods. The finished surface of the rod I bought wasn't beautiful and I wanted to make it a bit more attractive. I chucked the 48" long rod in my drill and made a simple jig to hold the distant end of the rod while I rotated it in my drill. The jig was a piece of 3/4" thick plywood, about 3" × 8" with a 1" deep V-notch cut into it along the 8" long edge. Once I put a piece of cloth in the V-notch the rod sat in the V-notch and didn't move around or get scratched.

Turn the drill on and move progressing grits of sandpaper along the surface in an even manner. Stop whenever you like the look on the surface of the rod.

Drill holes

The rods will sit in a hole in each side. Locate and drill those holes now. It's a good idea to drill a test hole in some scrap before committing to the real thing. The holes only need to be slightly over 1/4" deep. Next, check to see exactly how long each rod needs to be. In theory, this should be the "between shoulders" measurement of the shelf plus 1/2" to account for the depth of two holes. Cut your rod to that length, making sure to err on the short side, rather than the long side, of this number. Test fit the entire project, then sand all the wood parts and prep for assembly.

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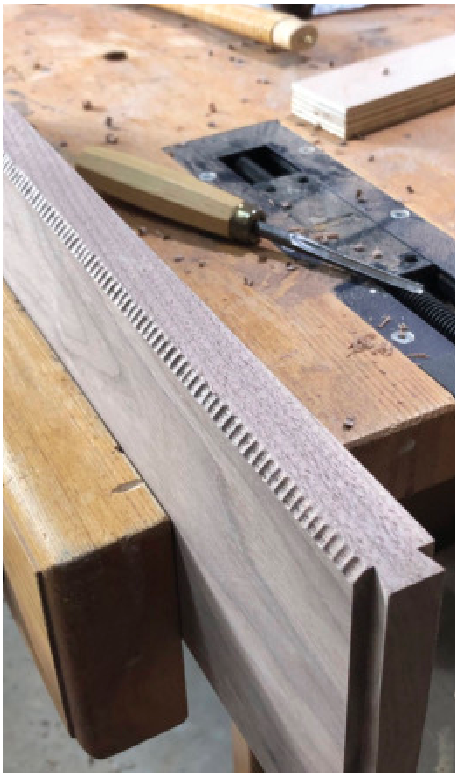
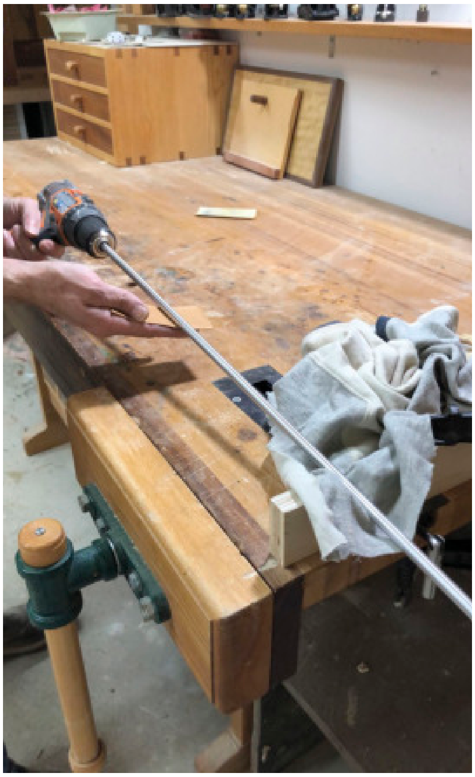
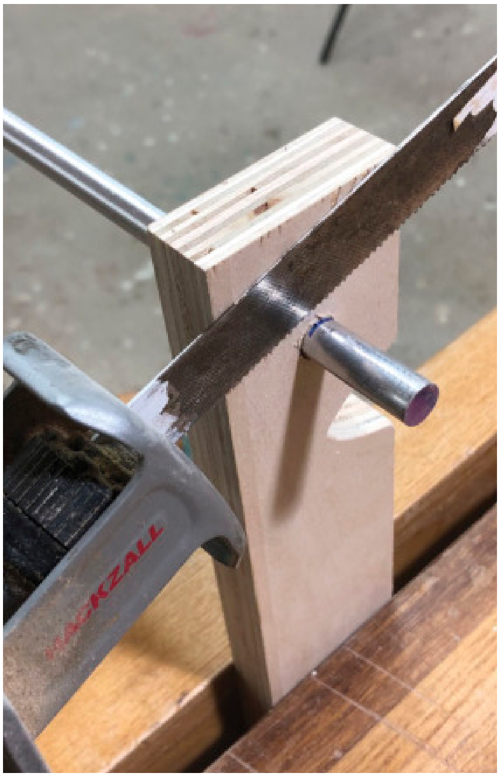


Add Some Spice – Texture can be added to the lower front edge of the shelf, although there's nothing wrong with skipping this step.



Rotate the Rod – Brown chucked the rod in his drill, then used a support with a V-notch to keep the other end stable, before rotating the rod and sanding its face so it looked and felt smooth.



Cut It to Length – A hole in a piece of scrap the same diameter as the rod will help keep the rod stationary while you cut it to length.

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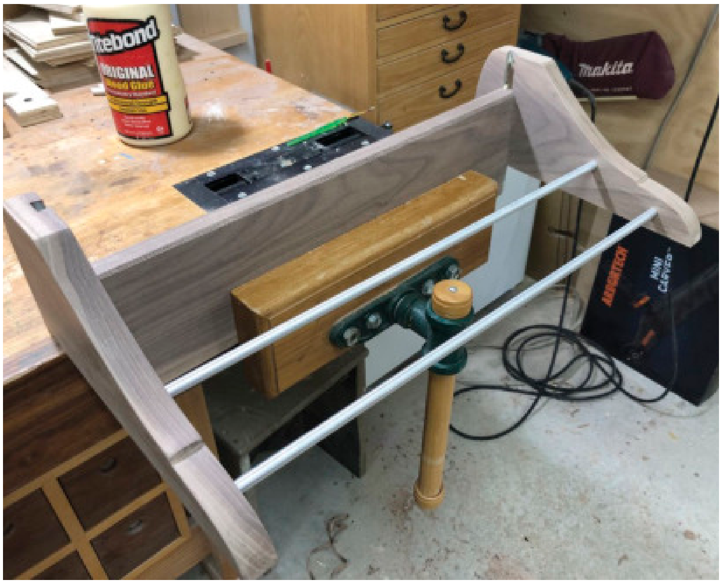


Bring It All Together – Brown used his vise to hold the shelf steady so he could start assembling the sides onto the shelf. Once the sides were about halfway seated, Brown had to remove the shelf from his vise and just place the assembly on top of his bench to bring the parts fully together.

Assemble the rack

Gather all the materials you need to properly assemble the project, then start applying glue. I add a bit of glue to both the dovetail tenons and grooves. Too much glue will cause squeeze-out, and due to the strong nature of these sliding dovetail joints, I slightly err on the side of applying less glue, rather than more. If this had been a large cabinet that would see heavy use, my approach would likely be different.

If you've dry assembled the project already, you've realized both sliding dovetails have to come together at the same time, while both rods are in their respective holes. Adding the rods after the three wood parts are assembled isn't possible. Working quickly, I applied glue to the parts, clamped the shelf in my vise, positioned the two rods in the holes and brought the sides into place. Once the dovetail joints were partially assembled, light mallet taps helped bring the sides into place evenly. Halfway through the process, I moved the assembly out of the vise and onto my bench so I could lightly and evenly drive the parts home.

Finish it off

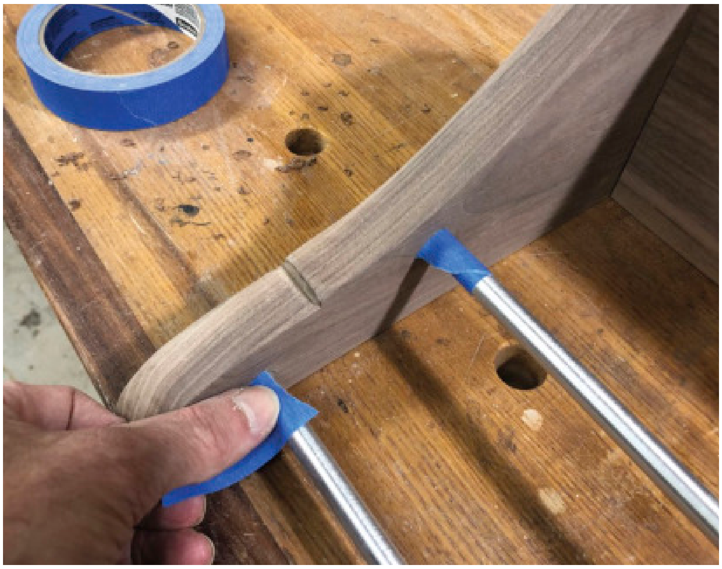
There's nothing wrong with applying a finish to the rods, though I wanted to apply an oil-based spray polyurethane to the black walnut, and didn't want to add any sort of yellowing finish to the nice, bright aluminum rod. I taped off the rods, then applied a finish to the wood.

Hang it up

Once the finish has cured, and you've removed the tape from the rods, find some studs and use 3/4" × 3/4" L-brackets to fix the medal rack to the wall. I hung the rack fairly high, so the medals could dangle down. Because of this, the L-brackets were placed on the upper face of the shelf so they wouldn't be seen.

The rest was up to my daughter, who hung her collection of medals and added a photo and trophy to the shelf.

Cover Up Any Mistakes – If you do end up with a slight gap between any of the mating surfaces, a small wedge and some glue will take care of that.



Keep Them Unfinished – To ensure no finish got on the rods, Brown applied tape to the distant ends of the rods, then used newsprint to cover the rest of the rods. Brown preferred no finish on his rods, but there's nothing wrong with applying a finish to your rods.

ROB BROWN
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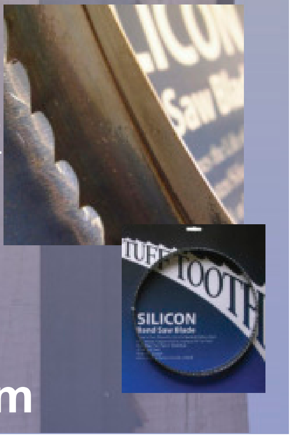

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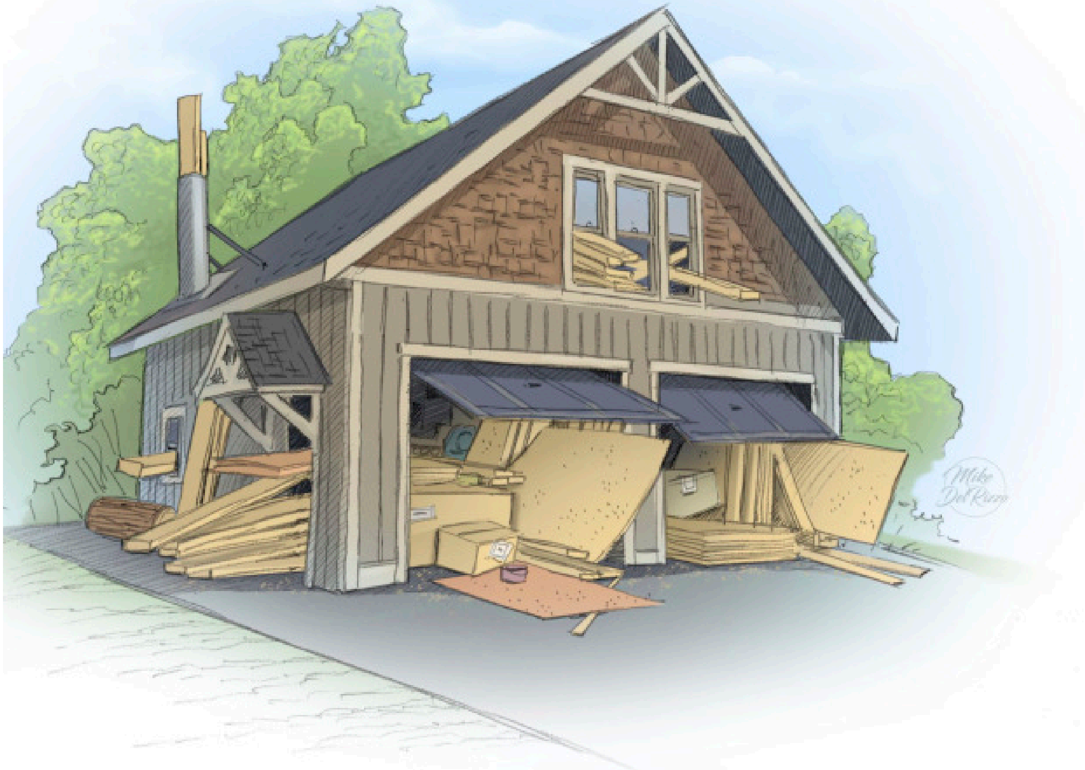


Sometimes I'll do anything to avoid cleaning and organizing my woodshop.

BY JAMES JACKSON

I'm happy to announce I was extremely busy making gifts and other items in the weeks leading up to the holiday season.

The not-so-good news is I quickly experienced a holiday letdown well into January. I had been so busy making things for Christmas craft shows and fulfilling holiday orders for clients that my shop quickly became a woodworking disaster during the weeks and months leading up to the big day.

The floor was littered with huge piles of bark from my live edge charcuterie boards. My tools no longer hung in their homes on my tidy pegboard on the wall, but were instead scattered around the shop. Piles of extra cardboard boxes were stacked on my workbench, on my CNC table and every other flat surface I could find – even not-so-flat surfaces like my lawnmower seat.

In a word, my shop was in disarray.

I headed out there in early January ready and eager to get started on orders for 2025. But when I opened the door and took one look around at the disaster before me, I made an abrupt turn and retreated back into the house for another cup of coffee instead.

Just the thought of cleaning up that mess gave me anxiety.

But I knew I couldn't just hide from the problem forever, no matter how many cups of coffee I poured, so I decided that instead of tackling it all at once I would break it down into more manageable tasks – essentially the same strategy I use on my two daughters to get them to clean their bedrooms.

I'd start by sweeping the floor. Simple enough, right? Not only would it be an easy task checked off my to-do list, the rest of the cleaning would be easier when I wasn't tripping over old bark. I swept it all up into several piles and into a box to be burned later.

Then I got ambitious and decided to scrounge up every piece of unusable scrap of wood so it could be burned as well. This filled a couple more boxes, and just like that another job was crossed off my list.

I burned the contents of the boxes and felt a surge of dopamine. I was getting things done!

Looking around the shop for more easy tasks, I found the box of metal wall racks I had bought almost a year earlier to get my wood off the workshop floor. I mounted them within an hour and had them loaded with wood soon after.

But then my productivity waned and I started to get sidetracked. I decided I needed to do a complete reorganization. My shop was never really well laid out, so with the wood out of the way I decided my next job should be to finally organize my tools and workbenches into a better "flow."

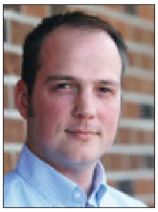
But there was one problem - an antique bookshelf with three sliding glass doors was in the way of that flow, and it had been ever since I moved it into the space to refinish last March. So tidying was paused again while I spent nearly a week staining and refinishing the cabinet.

And now as I sit at my computer typing these words, I know I need to get the rest of the tidying done… but then again, I really should wait until the cabinet is out of the shop and in its final home in our kitchen.

I wouldn't want to risk denting the new finish or getting it covered in dust, right? And the earliest I could get anyone to help me move it is a few weeks from now.

Oh well, I guess the shop will just have to remain a mess for another few days.

Now, where's my coffee?



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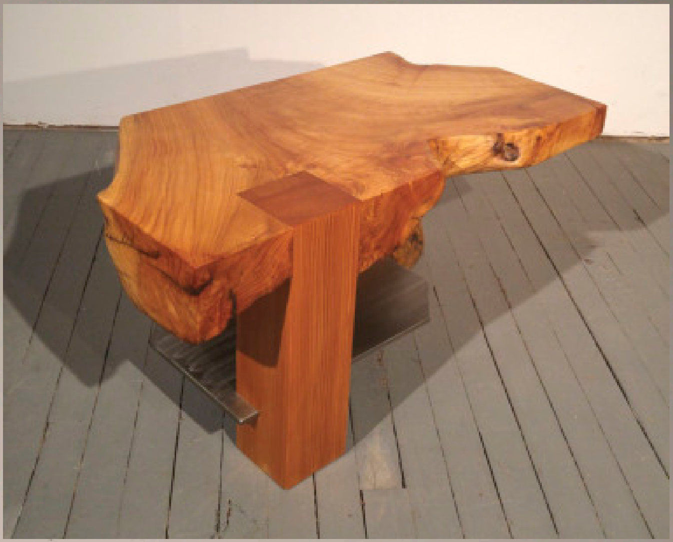
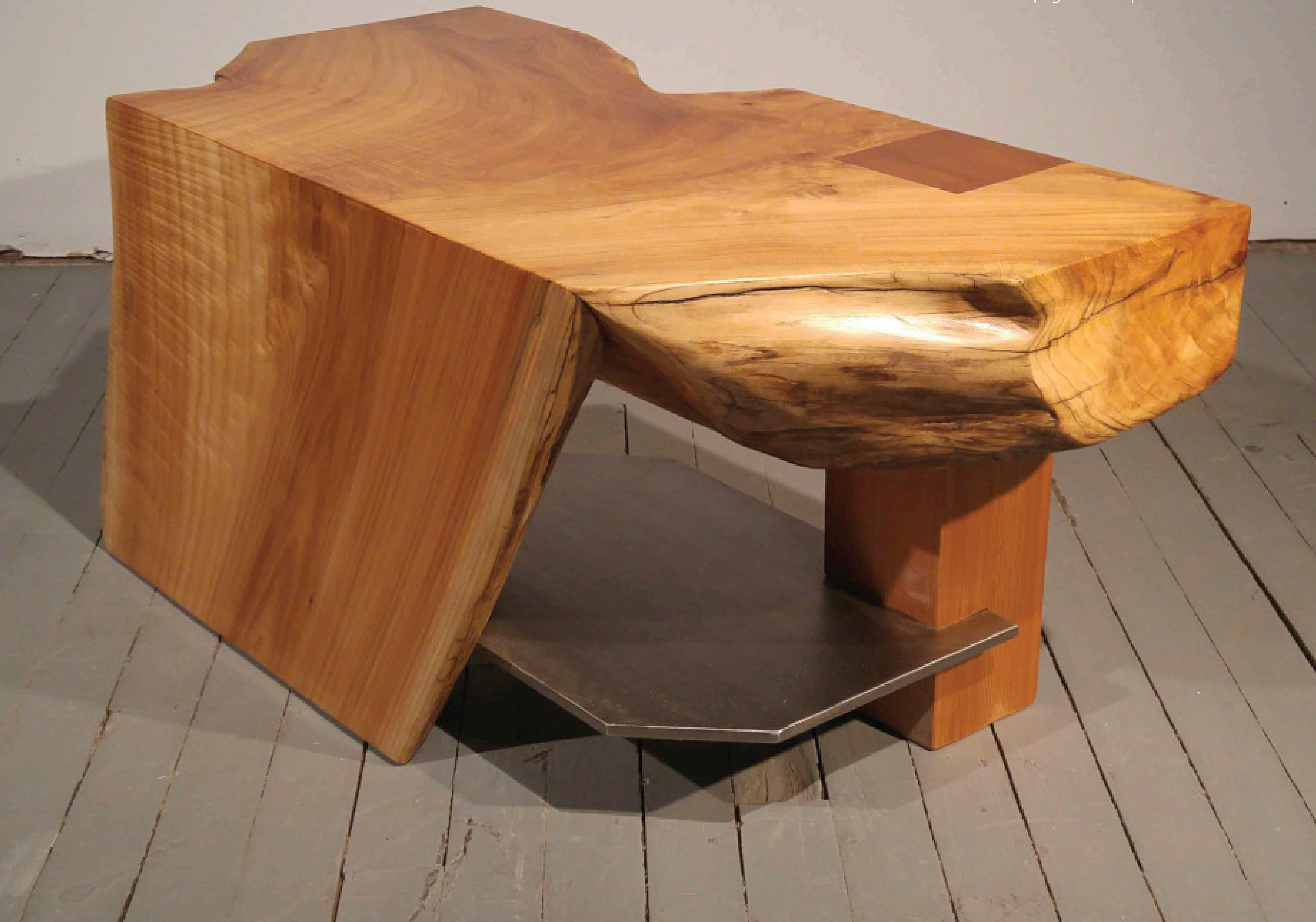
Jesse Toso

Mighty Mitre

This coffee table is made from a piece of western red cedar driftwood salvaged off the west coast of Vancouver Island. Toso was interested in making a large mitre joint to emphasize the grain pattern. The lower shelf is a reclaimed piece of stainless steel.



Turn to page 14 for quotes from Jesse.